THE IRON AGE -- December 22, 1932

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Putting men to work . .

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We build Turret Lathes. We have a substantial number of these finished and in stock. Nevertheless, for each turret lathe purchased from us we will put men to work immediately building a new one of equivalent value in order TO INCREASE EMPLOYMENT.

By this process you provide work not only for some of our employees, but for those of shops and mills whose products we use. Recovery demands cooperation in industry as never before.

If you are really INTERESTED IN PUTTING MEN TO WORK here is the way to accomplish it.

THE WARNER & SWASEY COMPANY

President

The Warner & Swasey Company, Cleveland, Ohio, U. S. A.

..THE IRON AGE..

DECEMBER 22, 1932

ESTABLISHED 1855 Vol. 130, No. 25

Technocracy's Challenge

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ALLEN RAYMOND, in the New York *Herald Tribune* of Dec. 15, gives us the following interesting sidelights on the record of "Doctor" Howard Scott, chief apostle of Technocracy, whose publicity introduction included the imposing title "engineer and technician of the Muscle Shoals project."

According to Mr. Raymond, who has evidently made a thorough search for facts, Scott is not a "doctor," has never received a degree of any kind, was prominently associated with the I. W. W. movement and was "an incompetent workman in a cement-pouring gang at Nitrate Plant No. 2 at Muscle Shoals for a short period during the war and was accused of sabotage by the superintendent of the job on which he was working."

While this sort of a background would be considered sufficient to imply a predisposition to condemn the present social order, which Scott facilely predicts is doomed, it should not prevent the consideration of his supporting facts, providing Technocracy has them and is willing to present them. The most damaging blows to public credibility in Technocracy have been self-delivered and are represented in unprofessional exaggeration and equally unprofessional concealment of method of obtaining data and of arriving at conclusions. These technocratic shortcomings were revealed in THE IRON AGE of Dec. 1 and are dealt with at more length on page 960 of this issue.

Technocracy has gained the larger part of what acceptance it may have because of its introduction to the public through the *New Outlook* and because of the fact that desk room has been given it at Columbia.

As Dr. Walter R. Ingalls, president of the American Institute of Weights and Measures, says: "Convalescing business has been hit below the belt by a pseudo-scientific fist, armed with the brass knuckles of an imposing but meaningless scientific jargon. Technocracy has presented a multitude of alarming conclusions, but has withheld supporting facts. The unprofessional withholding of evidence on the part of Columbia's technocratic guests is not in keeping with the research traditions of that university."

Were it not a rather pitiful commentary on human credibility it would be laughable to think of the large audiences of "solid" business and professional men who have listened with awe to the Jeremianic pronouncements of the bogus "doctor" and who have been so overcome by the non-understandable patter of "mumbo-jumbo" that they have swallowed it whole.

Scott has, however, performed one definite public service. He has shown us how anxiously the general public is seeking for economic light and leadership. And that if our recognized engineering bodies and statistical organizations do not, in conjunction with the brains of business and industry, supply this light and leadership, it will be sought elsewhere.

America is seeking promising "self-liquidating" projects. What project could promise us more profit than the immediate formation of a non-political economic council, under the sponsorship of leaders in business and industry and utilizing the coordinated resources of the many splendid statistical and economic organizations that we already have? Such a body would need no authority beyond the overwhelming authority of public opinion that would compel the fulfillment of a logical and definite program.

Rehabilitation Savings Establish

THE finishing of the surface of the crankshaft end of the connecting rod is done on a Blanchard two-column automatic surface grinder having two grinder heads (one roughing and one finishing), equipped with special fixtures for holding the work. The operator puts a rod horizontally in a station so that it rests on a three-point support and is forced back into proper position for grinding by an automatic clamp from the outside of the table. In this manner the rod is pushed back under two guides having a compound angle. The pin end of the rod is forced under the taper of a movable center which is backed up by a spring.

After one surface is rough and finish ground, about 1/32 in. being removed, the rod is taken out and placed in the adjoining station, locating on the previously ground surface and being automatically clamped by being pressed under two blocks having a compound angle. The pin end is supported by a flat spring. The opposite face is then rough and finish ground, about 0.010 in. of stock is removed. The machine has 24 stations, and the set-up is shown in Fig. 1.

Each head of the machine has a wheel control caliper mounted over the rotary table. The rods pass in succession under the first wheel, under the first caliper which controls that wheel, under the second wheel, and under the caliper controlling it. Wheels are 18 in. in diameter, operating at 1160 r.p.m. Each caliper controls the feed of the grinding wheel, compensating for variations in stock for wheel wear. The calipers are so sensitive that variations in work thickness are corrected before reaching the working limits and no rods need be returned for regrinding. Undersize work is impossible, as the caliper operates only on increases of thickness and the down feed of the grinding wheel remains locked until the caliper causes it to function.

The joint face of the connecting rod and cap is ground on a Blanchard surface grinder similar to the one just described, except for special fixtures as shown in Fig. 2. The rod is placed vertically on a fixture over the already drilled and reamed connecting rod bolt holes and is further located by an automatic moving pin locating the work from the wrist pin hole. This insures the maintenance of an accurate dimension from the wrist pin hole to the joint face. The work then is clamped by an automatic clamp. The cap is located in the machine from the bolt holes and is automatically clamped. The two grinding operations remove about 0.015 in. of stock and production totals 750 surfaces per hr.

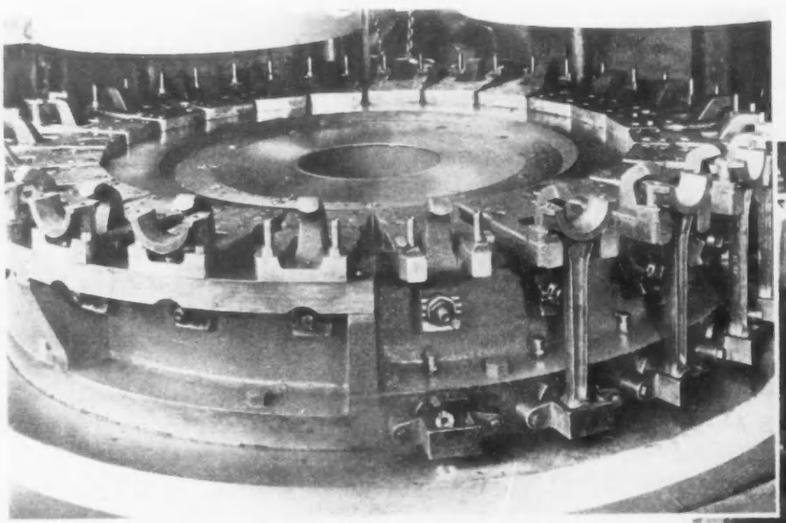


FIG. 2

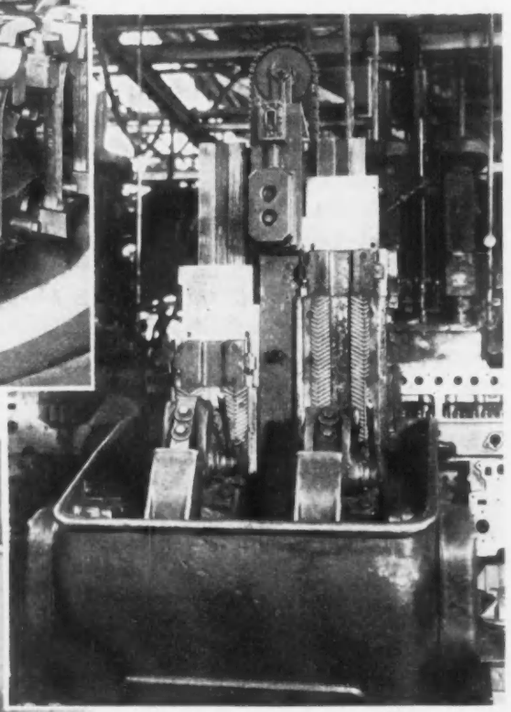


FIG. 3

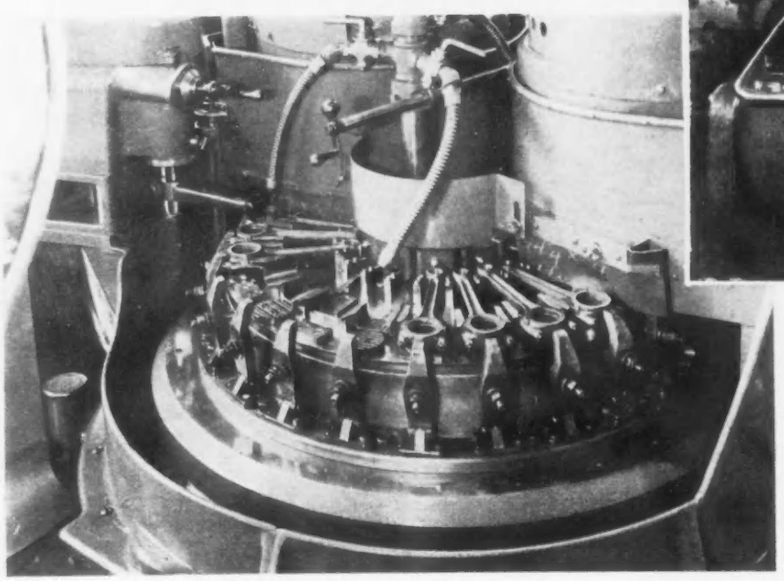


FIG. 1

Low Plymouth Costs

By BURNHAM FINNEY
Detroit Editor, The Iron Age

IN the Dec. 8 issue of THE IRON AGE, under this title, was published an article describing a number of the operations in the making of the new Chrysler "Plymouth." Considerable interest exists in the mechanical world in this subject because of the extensive modernization program which was effected in the Plymouth production line for the purpose of obtaining improved quality at lower cost. The description is continued on the accompanying pages.

▼ ▼ ▼

The contact face of cast iron bearing caps and the locating fit of the cap to the cylinder block are broached on a double vertical slide broaching machine, shown in Fig. 3. Each slide working reciprocally with the other carries a broach holder. The work is fed into an air-operated fixture; each fixture is designed to take two different-sized caps so that the machine can be operated without changing the set-up on any one of four caps. One man runs the machine, which turns out about 450 caps per hr.

Hardened steel valve insert seats are ground with portable flexible shaft grinders, three of the grinders being mounted on an overhead bracket, to form one unit. The grinding unit is offset and revolves eccentrically; the grinding wheel speed is 16,000 r.p.m. One man operating a unit of three grinders can grind 150 valve insert seats per hr. The set-up is illustrated in Fig. 4.

The crankpin end of four connecting rods is honed simultaneously on a Barnes single-spindle hydraulically reciprocated honing machine equipped with twin cylinders and a "Micromatic" connecting rod fixture and hone, shown in Fig. 5. The maximum stock removed by this operation is 0.0015 in. and production averages 240 rods per hr. A lever provides the manual control for starting the machine. A pilot valve controls the main reversal valve and the stroke length. Another valve near the machine's top controls the clutch which revolves the honing spindle. Just above the pilot valve is an automatic counting mechanism functioning on the stop rod and controlling the pilot valve and also preventing the reversing at the top end of a stroke after the required number of strokes have been made. The spindle stroke cylinders then continue in the upward direction, tripping the valve at the top of the machine. This stops the rotation of the spindle and the machine comes to rest until started again by the control lever.

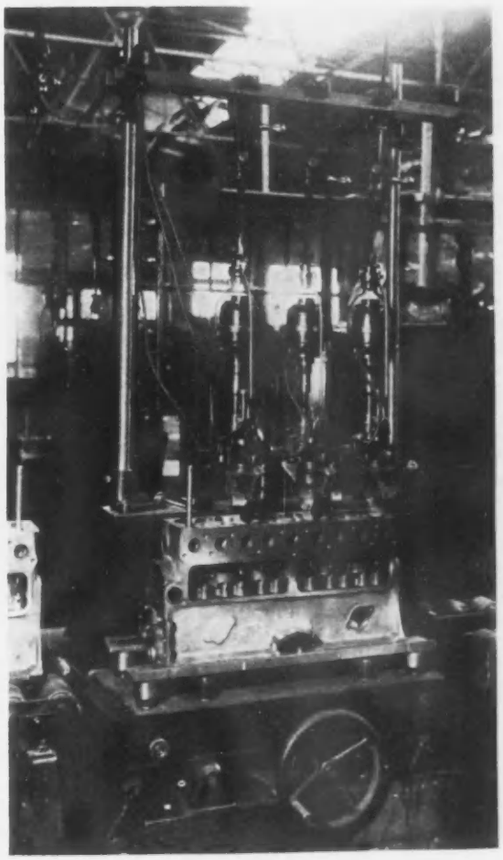


FIG. 4

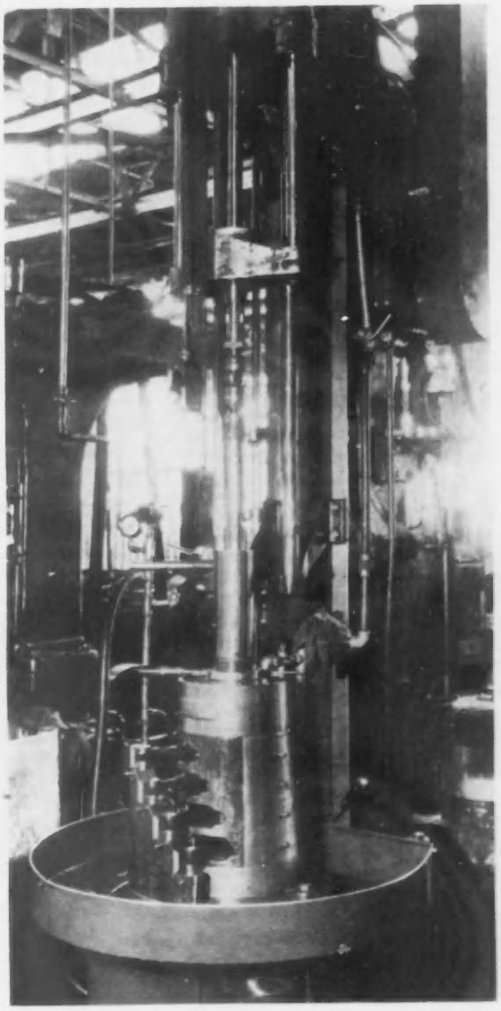


FIG. 5

How Bethlehem Steel Has Effected E

ANY program of employment stabilization must face the practical test. Only after a plan has been in operation can its real value be determined. In discussing the employment stabilization activities of the Bethlehem Steel Corpn., covering between 50,000 and 60,000 employees, I shall deal, not with abstract theories, but with our experience in this field.

At the very outset of the depression E. G. Grace, president of our corporation, laid down the policy that the maintenance of an effective working force is one of the most important measures for the long-run financial health of a business. One cannot break down an organization which has required years of development without losing ground materially when business returns. We have had plenty of grief in that respect in prior depressions. If the forces are shattered in bad times, there is no effective organization to take advantage rapidly of returning good business.

In speaking of organization, I refer to the men in the mills fully as much as the executive staff. Melters, rollers, machinists cannot be developed over night. A loyal trained working force is one of the great assets of a corporation. From a social and humanitarian viewpoint, management has recognized the necessity of providing employment so far as possible, and I regard it as particularly significant that business leaders are emphasizing the soundness of such a policy from the standpoint also of the long-run stability and success of their corporations.

The steel industry did not feel the depression materially until eight months after the stock market crash, not until the end of May, 1930. On June 23, 1930, Mr. Grace issued a bulletin to his executive staff which contained these words: "As operations are curtailed it is advisable to distribute the work among the efficient and loyal employees by dividing up the forces and working part time on part-time pay schedules."

This was one of the first corporation-wide moves in the policy which has been adopted to a greater or lesser degree by many industrial concerns throughout the nation. I believe the fact that we adopted the move as an executive policy affecting the entire corporation is an important point. There is always a tendency for one department or another to feel that it should be exempt, but such exemptions tend to undermine the effectiveness of the plan. The men themselves can see the necessity and validity of a program which affects all, whereas a partial adoption of such a measure always suggests the disquieting factor of favoritism.

Developments in Stabilization Program

These three years of hard times have been a particularly severe test of any employment stabilization program. The drop in business came from an all-time high peak. In our own company from 1921 to 1929 there had continuously been a careful selection of personnel. Our president has always taken an ardent and particular interest in this phase of Bethlehem's development. He has, in fact, always chosen to exercise the most intimate contact with every personnel policy in both its inauguration and execution. I emphasize this because of the significant benefits which have resulted all along the line.

As the depression advanced, we felt that the policy of shared work did not cover all of the existing situations. The main points in our program which have been adopted or developed during the depression may be listed as follows:

1. Distributed employment.
2. Extension of credit.
3. Emergency employment. (Made work).
4. Employee gardens.
5. Cooperation with community relief agencies.
6. Dismissal wage.
7. Advancement of pensions in special cases.

All these have been subject to various modifications under the varying conditions which have developed during the depression. Obviously, the grand total payroll has had to be curtailed, in line with decreased business, but all have shared what employment there was in order that a subsistence might be maintained for the maximum number of effective employees.

Our salaried forces have been included in the part-time schedules. Our executive staff on a salary and incentive basis of compensation has contributed proportionately more than any other group.

Application of Distributed Employment

Sharing available work among regular employees is applicable, in our opinion, only when it becomes clear that a business recession is of extended duration. For example, in normal times if one department is shut down for two or three weeks because of a temporary slack in orders, it would not be sound practice to revise the work sheets of other units of an organization to care for that brief lull. In normal times the regular employee has reason to expect a full day's work or a full week's work when such employment is available. It would be upsetting to morale to have the working hours continuously revised by a shared-work principle under normal conditions.

Indeed, in short-period recessions the temporary suspension principle, within limits, is probably sound. When conditions permit, it is probably wiser to have a large proportion of the working population employed at full wages than to try to spread the payroll out in order to carry everyone.

In a period such as we have been experiencing, however, where large masses of the population would be out of work except for a distributed employment policy—far larger masses than is the case today—the necessity of caring for one's regular working forces is inescapable.

The immediate situation appeals strongly for the reemployment of those now out of work. When men start back to work the backbone of this depression will have been broken. Of course, the company which has had the work-sharing plan in effect cannot do much toward reducing the army of the unemployed. It has already done this by the retention of surplus employees. However, companies which today have abnormal forces working full time can materially aid the situation by inaugurating such a plan, as this would require the reinstatement of laid-off employees.

The principle of shared-work in a crisis such as this is comparable to the practice of civilized peoples in a famine situation. If there is but a limited amount of food to go around no one would suggest feeding two-thirds of the distressed people fully and letting the other third starve. The available food is rationed. That is what we are now doing with work because there is a famine in work and work is basic to obtaining the necessities of life.

It seems to me that this policy is sounder in the long run than any plan which contemplated the dole, no matter what the dole may be called.

Employment Stabilization

By J. M. LARKIN
Assistant to the President,
Bethlehem Steel Corpn.

AN enlightened attitude on the part of management and employees has enabled large employers to keep their trained organizations intact, provide at least a subsistence wage for nearly all and contribute a new phase to industrial history, declared J. M. Larkin of the Bethlehem Steel Corpn. in an address on employment stabilization before the Industrial Relations Conference at Princeton University.

This development is "not something that suddenly sprang into life during this depression," he said, "but is the culmination of a decade of confidence building. It is the fruit of employee representation and all those agencies for human betterment that were envisioned as necessary to a new industrial order by a few of the leaders of industry a dozen years ago."

Experience bears out that schemes involving public administration, although often designed to meet a temporary emergency, have a way of permanently fastening themselves on the taxpayers' already overstrained pocketbook. The advantage of the work-sharing plan is that it will automatically terminate with a revival of business.

Details of the Plan

In application we have found that the distributed employment policy has been easier than we anticipated. In our steel plants we have found that the various department superintendents have worked out this problem with amazing efficiency. Great credit should be given to these men who have the practical job of putting the policies into effect. They have carried out the spirit of the plan to the letter. It has required resourcefulness and enthusiasm. Each plant manager has worked out a very simple means of providing himself with a continuous check on an equitable distribution of the work. This is accomplished by the preparation of a special payroll for each pay period. This readily shows up the high and low earnings of each individual on the payroll. In every department the plan has been followed out equitably and thoroughly. In the electrical division, for example, the repairmen who had no work of their own for a period were added to the force of control switchboard operators, sharing the work of the latter. In this way all were able to have perhaps three days' work a week, instead of half the force being employed full time.

In the machine shop, where the work is handled by a group of men representing many skilled crafts that are not easily interchangeable, the administration of shared work has to be dealt with accordingly. In such a case when a job comes in involving a certain group of machines, one particular crew may be put on for one or two weeks' continuous work until the job is finished. Then that crew will be held in reserve for some time and a different crew used on the next job that comes in. Interchangeability is a theory that does not work out in practice in some departments. This is especially true of drafting room work, supervision and some classes of clerical work; but in the main the work can proceed effectively for most jobs under a staggered work plan.

Even though the staggering of work presents special difficulties in the machine shop and certain other departments, nevertheless a definite schedule is kept in order to assure fairness. The machine shop superintendent, for example, keeps a master book in his desk where there is a record of all his employees. This book, together with control sheets, keeps the number of hours and days worked which each man has to his credit.

In the blast furnaces and openhearths, where the various classifications of work are largely repetitive and performed by established gangs on shifts, it is possible to schedule the hours of work of the total force of the department a month in advance. These schedules dividing the work evenly are posted on the bulletin board so that every man may see for himself not only the number of days of work which will be available to him, but also the amount of work which is allotted to his fellow employees. This provides a public check on the fairness of the system. The men do not hesitate to protest if they feel that they are not getting their share. The door of the superintendent is always open and if an adjustment seems necessary it is promptly made. The superintendents recognize that morale and a sense of fair play are important and they make every effort to have the men feel that everyone is getting a square deal.

Not only has the work week been shortened, but the daily working time as well. Maintenance and repair men who normally worked 10 hr. per day are now working 6 hr. per day. This is also true of some of the rotating shifts, where the three 8-hr. turn has been supplanted by a four 6-hr. turn.

Needy Cases Considered

So far as is feasible, the financial need of the men is considered. A worker who has a large number of small children or is facing the problem of illness may be given a few more hours of work than the single man. In fact, certain departments divide their personnel in two groups, wherein the secondary group is made up of younger single men who can stand a lighter schedule than those with heavier responsibilities. In the main, however, the question of need is taken up as a separate case in each instance.

It is not always possible to get an absolutely equal division of time for each employee within a given pay period of two weeks, but the constant check which is kept on the employee's earnings assures that over a longer period, say four to six weeks, they all get their fair share.

Limitations of Distributed Work

I believe that this principle of shared work will have a far-reaching influence in convincing our employees that the company has recognized that protection of the job is a matter of paramount importance. The regular employee has had demonstrated to him that his job is his greatest hold on economic security. Even though in the low levels of the depression area the number of working days has afforded barely a subsistence wage, yet I wish to emphasize that it has represented far more in total dollars than would obtain under any form of employment insurance and carries with it no stigma. The very fact that the man has a job, even though on a part-time basis, has spared him from the discouragement of being wholly without employment.

In the early stages of the depression we had the hope that the distribution of employment would solve

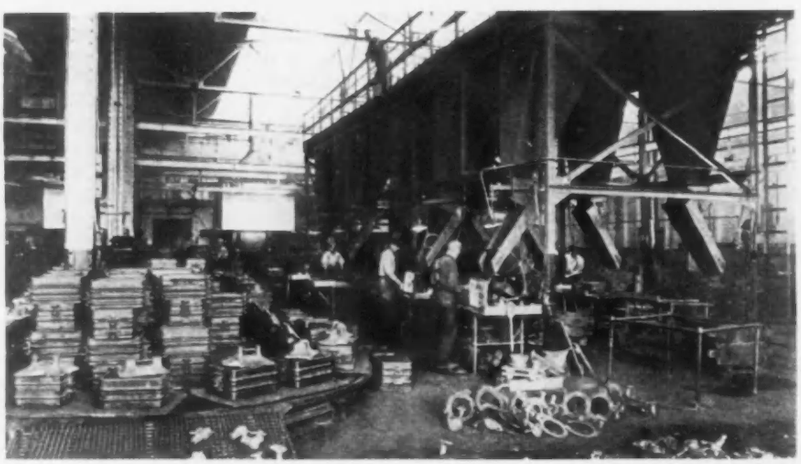
(*Continued on Advertising Page* 14)

Conveyors Used for Handling All Material Through a Modern Brass Foundry

BELOW

MOLDING machines of modern design are located in a row along one straight side of the mold conveyor and these machines are served by a battery of overhead sand hoppers supported by a structural steel framework. The freshly conditioned molding sand is carried on belt conveyor above this hopper structure and is plowed off into the various hoppers as required.

As each operator finishes his mold he places it on the conveyor, which is one step behind him. This conveyor, which is known in the shop as the carousel conveyor and which is operated at a constant speed, carries the molds through a pouring zone, a cooling zone and finally to the shake-out station. An interesting feature in connection with the supply of sand to these molders is the floor grating which surrounds each molding machine. This grating collects the strike-off sand or any loose sand which might otherwise collect. The complete absence of sand around the molders' feet is in marked contrast to conditions in some foundries. Sand which drops through the floor grating returns with the other sand to the reconditioning plant.



ABOVE

SCRAP brass collected all over the railroad system arrives at the plant in box cars alongside the receiving platform. From the cars the material passes down a short hinged chute to the lower end of a belt conveyor which carries it up to the second floor of the foundry. The conveyor structure is built of steel plates and angles and the elevating mechanism is an endless steel chain with 10-in. lifting blades inserted at right angles to the chain at every other link. The conveyor is set at an angle of 70 deg. with the horizontal and has a capacity of 4 tons an hour.

AT RIGHT

THE sorted scrap is carried by an overhead conveyor first to the weighing station shown in this view. Here it is analyzed, checked and weighed and then it continues on the same conveyor to the charging platform. Whenever necessary alloy additions are made at this weighing station. At the charging platform the boxes are dumped into portable hoppers set in front of each furnace. The hoppers in turn deliver the material into the furnace charging chutes. The steel charging boxes carried by the conveyor have a capacity of about 1 ton each and travel at the rate of 40 ft. a minute. They are dumped by releasing a latch at one end of the box.

THE Pennsylvania Railroad, instead of selling the miscellaneous brass scrap which accumulates at all points of the system, decided to equip a highly mechanized modern brass foundry and utilize this scrap as raw material for the production of its large requirements of new brass castings. Accordingly at South Altoona, Pa., it equipped a foundry with one of the country's most complete material handling systems used in the production of brass castings.

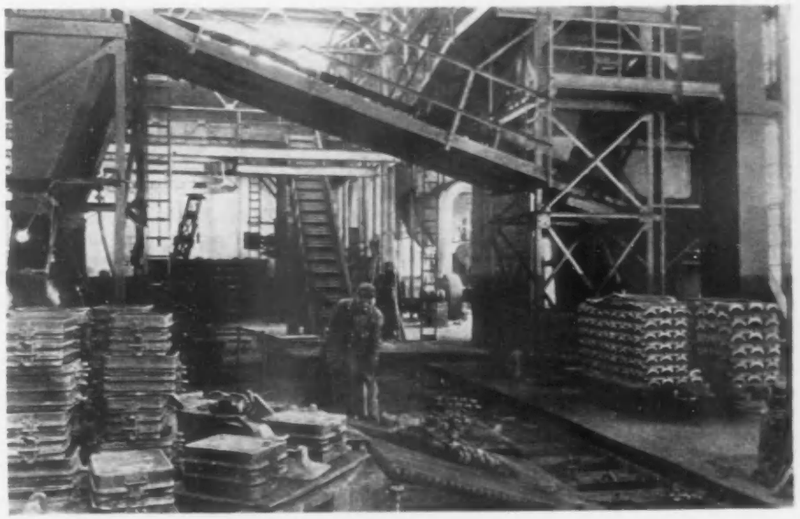
The accompanying photographs and captions describe some of the many elaborate and unusual material handling devices. The operation of the foundry is continuous, the molds being poured on moving conveyors from which the castings are continually delivered to a further conveyor while the used sand on still another conveyor is returned to the reconditioning equipment. The complete installation of handling equipment was made by the Jeffreys Mfg. Co., Columbus, Ohio, at a cost of about $40,000.

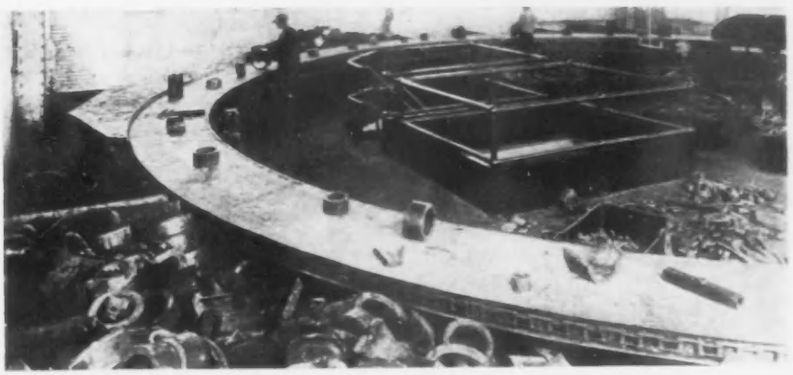
BELOW

MISCELLANEOUS scrap just as it happens to be collected and unloaded from the cars is discharged from the elevating conveyor on to the unique type of sorting table here shown. From this table the scrap is sorted by pickers and placed in steel charging boxes according to the selection desired.

This revolving sorter is essentially a large circular table with the central portion missing. It is made of one large solid plate of steel which has been built up from smaller pieces by welding. Flatness of this plate has been secured by welding stiffening angles to its under side. The table, which is 40 ft. in diameter, is mounted on wheels on a tee rail track and is driven by means of a chain wrapped around its periphery which meshes with a small drive sprocket. The working surface of the table is 30 in. wide and this moves around continuously at a speed of 45 ft. a minute by means of a 3-hp. motor. This gives the conveyor a capacity of 4 tons an hour, which is equal to that of the elevating conveyor which serves it.

The fact that the conveyor forms a complete circle makes it well suited for sorting because work which is not selected at one revolution will return again and again until it is finally placed in the proper charging box.





ABOVE

THIS shows the shake-out station. Here the castings slide down an inclined vibrating grating into an aproned conveyor which carries them up into bins over the tumbling machines. From these bins the castings fall by gravity directly into the tumblers. During this operation the sand which drops through the grating on to a belt conveyor is being carried to the reconditioning plant and the empty flasks are being returned by the carousel to the molders.

AT LEFT

THE pouring zone has been ingeniously worked out on original lines. It is located on a circular loop end of the mold conveyor and the actual pouring is done by men standing on a circular revolving platform whose speed coincides with the speed of the conveyor. The ladle is supported from an overhead circular conveyor which may be set to travel at this same speed or released to give the ladle free motion as desired. After pouring, the molds pass on through the cooling zone which has been carefully arranged to give sufficient length of time between the pouring zone and the shake-out to permit the solidifying of any type of casting which might be encountered.

Putting the Question Mark to Work

— 69 —

Low Expansion Alloy

Do you know of a steel alloy having a low coefficient of thermal expansion?
R. C. H.

WE believe Invar metal to be the best for this service. Invar contains approximately 35 per cent to 37 per cent nickel, with low carbon, the remainder being iron. The coefficients of expansion which may be expected at 100 deg. C. to 150 deg. C. are as follows:

35% nickel — 0 to 142° C. — 0.0000013
36% nickel — 20 to 100° C. — 0.0000012
37% nickel — 0 to 150° C. — 0.000003

This material can be secured in bars, sheets, strip, and tubing.

Republic Steel Corpn.

— 70 —

Waterproofing Concrete Tanks

We have leakage trouble in a concrete fuel oil storage tank. Can you offer some suggestions? **S. M.**

A GOOD concrete tank can be made water and oil proof without much expense if some care is used. The concrete surface should be free from cracks and loose joints. If these exist, cut a channel along the line of each crevice and refill with a moderately wet packing mixture of three parts clean sharp sand and one part Portland cement. Tamp to completely fill the channel and allow to set at least two weeks. Then prepare the surface for waterproofing by adding a ⅜-in. to ½-in. plaster coat. The plaster should be made of one part Portland cement and two parts clean, sharp sand somewhat finer than ordinarily used for brick mortar. Following this the walls should be wet down daily for a week and then left to dry out.

The waterproofing consists of applying successive coatings of a soap solution and an alum solution. Pure castile soap shavings in boiling water in the proportion of 1½ lb. of soap to 1 gal. of water form the soap solution which is applied first. The surfaces are best covered with a whitewash brush, keeping solution as hot as possible. Allow to dry two or three days until color indicates dryness. The alum coat or fixing solution is made of ¾ lb. of powdered alum to 1 gal. of water. Cold water is used. Thoroughly wet the dry soaped surfaces with the alum solution and allow to dry a few days when a hardened, insoluble compound will have formed. Repeat the process until three coats of soap and alum have been applied, and in our experience this will produce a water and oil proof tank.

The Alliance Brass & Bronze Co.

WHO MAKES THINGS?

WHO makes Z-metal? Who makes beryllium copper? Who sponsors the Z-Foil process? Who makes Invar metal? These are a few of the questions submitted recently and which will be answered on this page in early issues. Please address your questions or comment to Forum Editor, Iron Age Publishing Co., 239 West 39th Street, New York City.

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Nitrided Gray Iron Castings

Is there anyone now furnishing nitrided gray iron castings and if so what is the cost in comparison with standard castings? **L. C. C.**

GRAY iron cylinder liners suitable for nitriding have been cast successfully by the Janney Cylinder Co., Holmesburg, Philadelphia, and experimental work is being conducted at the plant of the Hunt-Spiller Co., South Boston, Mass., to solve the problem of making sand castings of gray iron containing aluminum. Although excellent progress is being made, these problems cannot be considered as solved at the present time.

V. O. Homerberg, technical director, The Nitralloy Corpn.

— 72 —

Fuel Oil Consumption

How much fuel oil should a 20-ton open-hearth furnace consume under normal operating conditions? **S. B. E.**

WHEN taking 10 heats per week, we feel that 36 gal. per ton of steel is a fair average for a 20-ton open-hearth furnace. If operation is increased to 30 tons, this figure might be expected to drop to 34 gal. For larger furnaces, say 50 to 55 tons capacity, 30 gal. of fuel oil per ton of steel represents a good average practice.

Sun Oil Co.

— 73 —

How to Reduce Pitting

How can we reduce pitting when pickling? **Schnefel Bros.**

OUR advice is very simple, namely, don't pickle. We believe the way to descale metal without pitting or etching or any other surface disturbance is to apply the Bullard-Dunn Process instead of the usual pickling process which latter, by its very nature, means that there must be some pitting or etching or else there is no pickling.

The Bullard Co.

— 74 —

Salvaging Car Wheels

The scrap pile of wheels from our mine cars seems unduly large. Is there some way of salvaging these? **W. E. C.**

IN our experience it has been possible to salvage nearly 75 per cent of discarded wheels of the type mentioned. The method is comparatively simple, and we are in fact making a specialty of repairs in this particular field. The flats are first built up with an electric welding process and are then reground to make the face or tread of the wheel accurately concentric and of the required diameter and contour. We have designed especially for this building-up process an electrode which produces a hard facing metal having great abrasive resistance. In many cases we have reports which indicate that the repaired wheels when placed back in service give a longer life than the original wheels.

Wilkes-Barre Welding & Machine Co.

— 75 —

Corrosion-Resisting Alloys

What is the best material to use for refrigerator tubes?

ALTHOUGH a vast amount of data has been published on the corrosion resistance of many alloy steels, the correct selection of a material to withstand a given set of corrosive and metallic conditions is often a difficult problem.

We cooperated in a recent test of tubing for use in refrigerator coils. Tubes made from the following four materials were investigated: Low-carbon steel, sherardized; low copper-molybdenum iron; 5 per cent chromium steel, and nickel-chromium steel (S. A. E. 3120). Of the tests made, which were designed to indicate the relative resistance to corrosion in actual service, the 5 per cent chromium steel ranked first and others in order were the nickel-chromium steel, copper-molybdenum iron, and carbon steel sherardized.

Electro Metallurgical Sales Corpn.

— 76 —

Selecting an Oil System

What oil burner system would you recommend for a reheating furnace in a rolling mill? **C. S. B.**

THE two desirable conditions in a reheating furnace are low flame velocity and a soaking heat. This is accomplished more readily by low-pressure air and oil than by impinging a high-velocity fire stream.

The Alliance Brass & Bronze Co.

Liquid Baths for Heat Treating—High-Temperature Salt Baths

By W. PAUL EDDY, JR.
Metallurgist, General Motors Truck Corpn., Pontiac, Mich.

THIS is the seventh in a series of articles on liquid baths for heat treating. In it the author takes up high-temperature salt baths, supplemented by a few paragraphs on the operation of salt baths of all types. The next and concluding article will be devoted to bath furnaces and temperature measurement.

Previous articles have included those on oil and lead baths in THE IRON AGE of Sept. 1, on cyanides in the issue of Sept. 15, and on salt baths in general in that for Sept. 29, on low-temperature mixtures in the issue for Oct. 20, on medium - temperature mixtures (first portion) in that for Nov. 10, with the second portion in the issue of Dec. 8.

I AM unable to recommend a salt mixture which will invariably produce perfectly hardened high-speed steel. The basis of salt baths for use above 1800 deg. F. (980 deg. C.) is borax. One mixture, which has been used, contains 72 per cent borax and 28 per cent boric acid; another, 80 per cent borax and 20 per cent calcium oxide. At least one better mixture than either of these has been made, but the composition has not been published.*

These two mixtures, as well as some others the composition of which I do not know, have certain limitations and defects. It is undoubtedly possible to eliminate or greatly reduce one or more of these defects, though possibly at the expense of other properties.

High-temperature salt baths are not eutectics but, when heated, soften gradually, like glass, and finally become liquid, the melting range being usually between 1600 and 1800 deg. F. (870 and 980 deg. C.). They are never, even at 2300 deg. F. (1260 deg. C.) or above, as thinly fluid, as are the salt baths used at lower temperatures. This means, of course, that the amount of drag-out is greater in the case of the high-temperature baths.

Pitting Action on Steel

Baths such as the above mixtures, when newly made, pit the work very badly. This action is gradually eliminated as the bath is used; the bath apparently becomes saturated with the compounds formed by its own chemical attack on high-speed steel—at any rate, the composition of the bath certainly changes, accompanied by a gradual rise in the melting range. After the bath has become satisfactorily inert to steel, old salt should not be thrown away. The drag-out losses are replaced by new salt, and care should be taken not to add more than 5 or 6 per cent of the weight of the bath of new salt in a day's operation, else pitting may occur.

For preheating, the same salt is sometimes used, maintained just above its melting point; the work should be held in the preheat bath until the salt runs off freely when the work is lifted from the bath. In order to shorten the time in the preheat bath, an additional semi-muffle or muffle heating should be used, in which the work is heated to 1000 to 1200 deg. F. (540 to 650 deg. C.) before transferring to the salt preheat. If preferred, a single preheat of the muffle or semi-muffle type, as in air furnace practice, may be substituted for the double preheat.

Heating Practice

High-temperature salt baths heat somewhat more rapidly than do air furnaces, although the difference is not so great as it is between medium and low-temperature baths and the corresponding air furnaces. As in ordinary methods, high-speed steel should be heated to the bath temperature and immediately removed—not only to obtain the best structure, but also to minimize attack of the heating medium on the metal. Even with baths which do not pit, there is often a washing or solvent action on the work, which tends to round off sharp corners and to remove metal more or less uniformly from all surfaces exposed to the liquid. This action is scarcely noticeable on small work, properly handled, and it is in this field that the high-temperature salt bath is best used.

If you have large numbers of small tools—not necessarily alike in shape or section—which must not be allowed to scale, and if cost is not paramount, it is possible that a salt bath will fill the bill. You must be prepared, however, to study the bath process at least as carefully as you would any other, if you desire to turn out good work consistently. The fact that several tool manufacturers of good repute continue on, year after year, with salt bath hardening is evidence that it can be done.

Quenching and Cleaning of Work

Perhaps the greatest disadvantage of the high-temperature bath mixtures is that none of them is easily cleaned from the work. It is almost imperative that a salt quench be used. The salt quench consists of an added unit in the system in the form of a pot containing a chloride-carbonate bath, such as XII, XIII or XIV, maintained just above its melting point, and preferably below 1200 deg. F. (650 deg. C.). Such a bath reacts chemically, with some sputtering, with the high-temperature salt adhering to the work as it is lowered into the quench, the reaction being between the carbonates in the quenching bath and the borates in the high-temperature bath. It is unnecessary, for purposes of hardening, to agitate the work in the quench, but a little stirring is advisable from the standpoint of removing the high-temperature salt. The products of the reaction (metaborates) form a heavy sludge in the bottom of the quench pot. This sludge must be frequently removed and thrown away.

It makes little difference how long the work remains in the quench; the action on the high-temperature salt practically ceases as soon as the work becomes cooled to the temperature of the quench. The work may be removed at any convenient time thereafter and cooled to room temperature—preferably in still air.

Then comes the cleaning operation. In spite of the salt quench, some high-temperature salt will still be found adhering to the work. If electrolytic cleaning apparatus is not available,

(*Concluded on Advertising Page* 18)

*H. C. Knerr: "A New Method for Heat Treating High-Speed Steel"; *Trans.* American Society for Steel Treating, Vol. XV, No. 3 (March, 1929), pages 429 to 450.

The Facts and Threats of Technocracy

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I AM glad to have this opportunity to discuss with you the relation of the machine to employment, particularly in view of the widespread interest aroused in this subject by the group called "Technocracy."

From the standpoint of publicity, Technocracy has done a good job. It has put the machine, as well as itself, in the limelight in no uncertain way, very largely, I dare say, through the unintentional aid of Alfred E. Smith and public interest in his *New Outlook*. Be that as it may, Technocracy has made at least a fair start toward making the public machinery conscious, even though it required the stuffing of a bogey-man labeled "National bankruptcy in 18 months" to produce this effect.

For this arousing of interest, those of us who hold beliefs contrary to Technocracy should be grateful. For it gives us an opportunity to gain a public hearing for the other side of the story.

As you are aware, the art of dismal prophecy goes back a long way into history. Jeremiah of 500 or 600 B. C. had quite some reputation in that line. Malthus, who died about a century ago, predicted that population would increase faster than food supply, thus causing starvation among the masses. Even before our Civil War and long before electric power had been introduced to industry or the public, there were grave discussions in American periodicals concerning the alarming growth of mechanism and productivity, and the statement was made that "This country will never be able to consume all of the goods that these machines can produce."

Most of the older prophets worked chiefly upon inspiration, or if they based their conclusions upon facts, the facts were not presented. The prophecies were put out as rather dogmatic conclusions. As the public grew more intelligent, or more skeptical, those who forecast forthcoming economic changes were inclined to bolster the assertions with as much supporting data as possible. In the case of the latest prediction of economic chaos, Technocracy apparently has reverted to the older prophetic system. Certainly no sufficient data or explanation of method of arriving at conclusions has been given to warrant our accepting such dogmatic statements as that "the price system is doomed."

No worthwhile engineer, statistician or economist could take exception to leading up to a logical conclusion. I hope, and believe, that business paper editors are equally fair-minded. In the case of Technocracy's pronouncement, however, I believe that we are at liberty to take exception to the following:

FIRST: The modus operandi in introducing this subject to the general public through a sensational semi-popular magazine article rather than through submission of evidence to recognized fact-finding or engineering bodies.

SECOND: The appearance of glaring errors in factual data, appearing not alone in the Wayne W. Parrish articles in the *New Outlook*, but to similar errors in publicity material released by Columbia University regarding Technocracy and in the statements of Dr. Scott, Technocracy's mentor.

THIRD: The serious error involved a fair, unbiased presentation of facts in the attempt to convert theoretical ideals into representations of attainable practicalities and the statistical error of substituting inadequate "sampling" for unobtainable overall data.

FOURTH: And basic, that the limits of human progress can be defined by our present known inventory of power resources.

I will deal with these in order.

Little was known, at least to the general public, about Technocracy until the article "What Is Technocracy?" appeared in the November number of the *New Outlook*. It is true that a bulletin or two had previously appeared addressed to restricted lists and outlining the purposes of the organization and that articles by Dr. Scott had appeared on this subject in the *Living Age* and perhaps elsewhere.

Recognized statistical bodies and publications such as THE IRON AGE had of course known of the work being done and had made attempts to find out about it. I am informed that none of these organizations have been allowed to make more than a cursory examination of data or methods. THE IRON AGE, some several months ago, wrote to Dr. Scott requesting the report of the organization on its work to date, but was informed through its "Public Relations Counsel" that no report was available.

The cleverly written and quite sensational article in the *Outlook* was therefore the first broad public announcement of Technocracy. So far as I am aware, no recognized statistical, engineering body or organization of economists were asked to examine, criticise or substantiate either data or conclusions before the publication in the *New Outlook*.

If Technocracy attempts to stand upon its presentation to the public in the *New Outlook*, it will be upon slippery footing. I venture the prediction that author and article will be disowned. However, in view of the contrast between the freedom with which the young author speaks for and about Technocracy, and the obstacles placed before recognized engineering and statistical bodies who have sought to examine Technocracy's data, the disclaimer may not be easily made.

Some of you are aware, as I am,

THOSE interested in obtaining an answer to the question: "Is the Machine Responsible for Unemployment?" are referred to the following bibliography of articles appearing in The Iron Age on this and closely related subjects during the past two years. That of July 9, 1931, entitled "Here Are Some Facts," was a complete refutation of the entire Technocratic conclusion of accumulative technological unemployment. It was the first analysis, we believe, of employment statistics on the rational density basis of "number employed per 1000 population."

Machinery Needs a Friend
Mar. 12, 1931, page 845
Among the Robots
Mar. 12, 1931, page 847
One Word Costs Billions
Apr. 9, 1931, page 1165
How to Win This War
Apr. 16, 1931, page 1287
Idle Money, Idle Men
May 28, 1931, page 1767
Let's Go Back to Arithmetic
June 11, 1931, page 1884
Price Versus Cost
June 4, 1931, page 1845
Here Are Some Facts
July 9, 1931, page 121
Dat Ole Debbil Machinery
Oct. 8, 1931, page 923
The Machine Has Been Libeled
Dec. 24, 1931, page 1605
What Must We Do to the Machine?
Mar. 10, 1932, page 595
Plain Talk About Technocracy
Dec. 1, 1932, page 849

REPRINTED in the daily newspapers from coast to coast, the article "Plain Talk About Technocracy" in The Iron Age of Dec. 1, has undoubtedly caused more comment than any other pronouncement in this publication in many years. Proving, as it did, the vulnerability of Technocracy's data and methods, it formed the spear head for the ensuing rebuttal from many quarters, which has effectively squelched the bogeyman of technological disaster.

The accompanying amplification and extension of this rebuttal, representing an abstract of Mr. Van Deventer's remarks before the Conference of Statisticians in Industry, at The National Industrial Conference Board, Dec. 13. It may be of some significance to our readers to know that Technocracy was urged to present its side of the case at the same time before this important group of recognized statistical authorities, but failed to accept the invitation. It might be surmised from this that Technocracy is more interested in presenting its assertions to the layman than its proofs to experts.

through broad contacts with industry, that Technocracy's startling assertions have caused considerable alarm. Certainly they have not helped the cause of business recovery. We are inclined to question the motive for barnstorming the country and crying "the wolves are coming!" and neglect in telling us where to find the gun.

We are also entitled, I believe, to resent the impression undoubtedly conveyed to most lay readers by the *Outlook* articles that the findings and conclusions set forth are those of a recognized and authoritative technical body. No one who does not know the real situation regarding the personnel of Technocracy—and very few do—could escape the conclusion that the pronouncement was that of an engineering organization of considerable responsibility, especially as Columbia University and Nicholas Murray Butler were introduced as part of the background.

According to the *New Outlook* article, the mathematics employed by Technocracy are "more complex than Einstein's Unified Field Theory," of which it is said that there are but a handful of mathematicians in the world able to follow its reasoning. Possibly it has been because of a belief that the majority of engineers, statisticians and economists would be unable to scale the necessary mathematical heights that has impelled Technocracy to withhold its supporting data. Fortunately, however, it requires no Einstein order of mathematical ability to examine some of the very few supposed facts which adorn the *Outlook* articles and to note, in each case, errors, fractions and infractions of the truth as well as what might be called gross exaggeration. As Ex-Governor Smith himself would say, "Let's examine the record."

I quote the following statement from the November *Outlook:*

"In pig iron production, one man working one hour can do what it took him 650 hours to accomplish 50 years ago."

The laymen's conclusion to this unqualified statement is that 50 years of mechanization, etc., have speeded up productivity per man 650 times in a half century in the making of pig iron.

In 1929, the output, per annum, was 1710 tons per worker. In 1879, production per man was 73.7 tons. Instead of productivity in pig iron having increased 650 times in 50 years, as Technocracy intimates, it has increased 23.2 times.

Even if we gave Technocracy the benefit of a 12-hr. day in 1879 and an 8-hr. day in 1929, there remains an exaggeration of more than 20 times in its statement as compared with the facts.

Again quoting from the November *Outlook:*

"Man hours per unit of product and labor cost per unit have dropped in recent years to levels approaching zero. So it is that our photograph of a modern steel rolling mill in operation shows the plant without a human being on the floor."

The layman's conclusion must be that technological advances in steel mill practice have virtually made this a laborless industry. Let's get at the facts. In 1879, 50 years before the present depression, there were 24 workers employed in the United States in steel works and rolling mills for each 10,000 of population. In 1909, the density of employment in this industry had increased to 26 persons per 10,000 of population. In 1929, it was 32 persons per 10,000 of population. Note what happens to theory and to broad assertions when confronted by facts.

While we are on the subject of steel, I will turn for a moment from the *Outlook* to a bulletin issued by Prof. Rautenstrauch of Columbia University some months ago, describing some of Technocracy's activities.

In this bulletin, Prof. Rautenstrauch quotes Scott as follows:

"'The steel produced in 1900 amounted to 11,000,000 metric tons and required 600,000,000 man-hours. In 1929, with a production of 58,000,000 metric tons, only 770,000,000 man-hours were needed.'"

The impossibility of securing accurate man-hour data is indicated by Scott's exceedingly "round" numbers. I will deal with this later.

He goes on to say that "Thirteen man-hours per ton were required in 1929, as compared with 70 in 1900."

If we apply the common garden variety of arithmetic to Scott's statements regarding 1900, on the basis of his own figures and dividing his 600,000,000 man-hours by his 11,000,000 metric tons, we find, not 70 man-hours per ton, as he states, but 54.5.

Then, too, his man-hour statements are evidently based on the broad assumption that 12 hours constituted a working day in the steel industry in 1900 and eight hours in 1929. This is not true. Even today there is not a universal acceptance of the eight-hour day in the steel industry by any means.

Furthermore, how deceptive his statement is with its import of technological displacement is shown by the fact that in 1929 there were 32 persons per 10,000 of population engaged in steel making against 24 in 1900.

Returning again to the *New Outlook*, I quote the following:

"In 1929 we mined on the Mesabi Range at the rate of 20,000 tons per man per year" (iron ore).

And now let me quote the comment upon this by Cleveland ore-mining authorities:

"Any picture of productivity per man in the ore industry which applied only to the open pit mines would be a distorted one, due to the fact that a substantial portion of iron ore is taken from underground mines where the output of necessity is very low, compared with open pits. Ore authorities estimate that the average productivity per man in the Lake Superior district in the underground mines ranges from 1600 to 1700 tons per year, while the average for open pits is 8000 to 12,000 tons per year, in contrast with Technocracy's figure of 20,000."

"Figures on the Lake Superior iron ore mining industry compiled by the Department of Commerce and checked by ore people in Cleveland show that in 1929 the output per employee in the iron ore mines in the United States was 2386 tons."

Again quoting from the November *Outlook* article, and also from Scott on the *Living Age:*

"One hundred men working steadily in modern plants could produce all of the bricks the country needs."

This statement is a theoretical one, evidently based upon a statement made elsewhere in the article that "a modern, continuous, straight line brick plant will produce 400,000 bricks per man per day."

The practical brick man knows that brick-making can never be centered in a few large production plants because of the large proportion of cost represented by haulage of raw and finished materials. This economic fact dictates that brick making plants must be well scattered and serve comparatively restricted areas. To show how fact differs from theory, there were more than 35,000 wage earners employed in 1929, in making common and face brick, receiving an annual amount in wages of $38,450,967. There has been very little technological advance in the brick-making industry, as in other industries, since 1929, because of the suspension of capital investments. (1929 is the latest year for which Government statistics are available.) Note the discrepancy between Technocracy's theoretical 100 workers and the 35,000 actually employed.

Bricks and Geography

Also note the following comment in the New York *Herald-Tribune* for Dec. 8:

"An article recently appeared in one of the well-known periodicals which contained some erroneous statements regarding the capacity and the labor required in the manufacture of brick. It made the statement that a modern brick plant could produce 400,000 brick per man per day, whereas the fact is that very few plants, even though highly mechanized, can produce in excess of 2000 brick per man per day.

"As the article in question has received very wide circulation, and as we have had a great many inquiries concerning its accuracy, the brick industry in this district feels that the public should be informed of the facts, and should not be misled by writers who obviously are not familiar with our industry."

R. S. Tilden, Engineer-Manager New York and New Jersey Common Brick Association.

Engineers at Nela Park have called attention to the error in Technocracy's statement showing a 9000 to one ratio in productivity of electric light bulbs through the use of the Corning machine.

The point may be summed up by saying that there is only one Corning machine and its product is one of five or six products entering into the bulb put on the market. Any savings in the production of this machine must be taken with and averaged with the other articles that go to make up the assembled product. An efficiency ratio of about 16 to one might be considered correct if contributory operations be taken into account. A rate of nine to one would be a fair average on all operations on the bulb itself. If the overall average result—the various operations on all parts that enter into the lamp—is the thing aimed at, then the average may be stated at four to one. This, of course, is vastly different from the 9000 to one ratio set up in the *Outlook* article.

Light, of course, is the conversion of energy, and as time goes on we are making it cheaper and better. What the American people buy is light. Mr. Sloan of Nela Park claims that the reduced cost to the American people of this commodity amounts to approximately $33,000,000 in a year, whereas the penalty to wage earners as a result of technological unemployment is perhaps $5,000,000. In 1914 his company had 6928 men engaged in the production of incandescent lamps as compared with 4840 men in 1932. In his opinion this 70 per cent rate of employment in a year of depression as compared with the number of men used at the time cited by the *New Outlook* article is quite satisfactory.

Quoting from the December *Outlook:*

"If the comparatively new fibrous nettle plant, ramie, is introduced to industry (and eventually it will be) the entire wood pulp, silk, wool and cotton industries would be very seriously affected. Ramie has a 22-in. fibre, can be raised 1500 lb. to the acre (compared to 150 lb. of cotton) and two and three crops can be obtained in a year in the Southern States. There is no problem of picking, since it can be cut and bound with a tresher. If made into suits it wears seven times as well as wool, and several hundred times better than cotton. It has the advantageous property of being stronger when wet than dry. It can be made into paper cheaper than wood pulp and the paper can't be torn by the human hand. It has a lustre similar to silk and linen, can be woven with silk and rayon or wool and cotton, and takes dyes beautifully. The technologist can refine and prepare ramie for spinning by complete automatic process. Here is a fibre far superior to cotton or wool, that can also be made into paper that is many times better than wood pulp paper, and it can be manufactured with a bare minimum of operators. How soon will ramie enter the scene? Rayon was held off twenty years, but eventually these new materials are plunged into the competition. Meanwhile we buy suits that wear out quickly, linen and other goods that the laundry makes fast work of, and we print on paper that tears easily and uses up our forest reserves. Why?

An Idea Exploded Years Ago

Here is the answer to the above by an outstanding textile authority:

"Eighty years ago ramie was on a commercial basis and was about as highly developed then as it is today. Nothing new has been discovered, but about every six months someone who is in need of a job tries to get capital to finance his idea of doing something with the fiber.

"Despite the fact that it has considerable tensile strength, it has very poor wearing qualities and cannot compete with cotton, wool and flax on a commercial basis. It can be and has been grown in this country, but the market for it is limited, as it does not stand up in competition with the present fibres.

"The author's apparent surprise that ramie is stronger wet than dry reveals his ignorance of the subject. All vegetable fibres are stronger wet than dry."

Quotation from the December *Outlook* article:

"One of the simplest examples of waste in holding up our price system is a common article like the razor blade. The technologist can easily produce a blade with a tungsten carbide edge on a steel wafer base at just twenty per cent additional cost of a blade today. But the blade would last a life-time and longer. The razor blade industry could quickly supply the nation with these life-time blades, but the plants would have to shut down almost immediately. After a few weeks the demand for blades would be almost non-existent. The plants are open today only by marketing a product that needs constant replacing. It is not only unnecessarily costly but respresents a sizable wastage of valuable resources."

What Cutlery Manufacturers Say

Note this answer from one of our largest cutlery manufacturers:

"I have your letter of Dec. 6 regarding the use of a cemented carbide edge on a razor blade.

"Through the courtesy of Mr. Comstock and other officials of the Firth-Sterling Steel Co., I have been privileged to watch the development of carbide. Early in the development of this material, Mr. Comstock suggested its use as an edge for razors. While there has been considerable improvement made, the material is still too brittle to take and hold a razor edge.

"Most men are not so much interested in the wearing qualities of a razor as they are in the cutting qualities. As a matter of fact, the old fashioned razor, which we still manufacture, if properly taken care of will last through two or three generations.

"When and if Mr. Comstock is able to produce carbide that will take and maintain a keen edge, we will immediately try to produce a razor made of this material."

This reveals two errors in the *Outlook* statement, first that such an improvement could easily be made, and second that razor manufacturers would not adopt it if it could be made.

That the errors of fact are not confined to author Parrish is evident from the Columbia University Bulletin issued by Prof. Rautenstrauch and previously mentioned.

Quoting Scott: "The maximum of

employment in industry was reached in 1918 and has declined ever since that date."

This statement is not in accordance with the facts, either on the basis of total number employed or of number per 1000 of population. From the "Summary of Manufactures" in the "Statistical Abstract" we find that the total number employed in 1923 exceeded the total number in 1921 by 1,831,000, and again we find that 1929 exceeded 1927 by 486,000, showing that employment has not declined continuously since 1918.

Furthermore, as you all well know, 1918 was a year of abnormal employment density due to the speeding up of all industrial activities because of the war. No economist would claim that this abnormal rate of employment density could be or should be expectably maintained and no one should attribute its recession to technological causes.

I could proceed at length with respect to the errors which appear in Technocracy's pronouncements. To us it may seem almost childish and quite unnecessary to controvert such obvious misstatements. But we must remember that the laymen who read the *Outlook* and also I fear others who should be able to detect them are quite inclined to swallow them whole, coated as they are with the prestige of supposedly profound authority. It is enough but not too much to say that this false evidence, in itself, should be enough to throw Technocracy's case out of the court of public opinion.

Human Nature Left Out

Now we come to the third point of indictment, namely, the serious error involved in the attempt to convert theoretical or ideal attainment of isolated character into calculations of practical attainability and also the obvious statistical weakness of substituting inadequate sampling for unobtainable overall data.

According to its spokesman, "Technocracy is an integration of physics, chemistry, geology, geo-physics, thermo-dynamics, zoology, bio-physics, biology and physiology." At first glance there does not seem to be anything missing, but upon a second examination we find that psychology or "human nature" is omitted. This omission is evident when we examine some of the methods of arriving at conclusions.

It is as incorrect to assume that because mechanism demonstrates an ideal capacity in an individual case, an industry can be brought up to that as an average as it is to assume that if one runner runs 100 yards in nine seconds, all two legged animals can be made to do the same. Witness Technocracy's theoretical 400,000 bricks per day per man as compared with the industry's actual best performance of 2000 bricks per day per man. Management and human inertia enter into these things as well as mechanisms.

M. D. C. Crawford, in the *Daily News Record*, Dec. 9, illustrates the fallacy of Technocracy's application of power and productivity "theoreticals" as follows:

Unborn Unemployment

"But of course the arch-demon of that time was 'Jimmie' Watts, who made the steam engine practical. Parliament gave him a 25-year monopoly and other substantial rewards. He was actually looked up to by his contemporaries and treated with almost the distinction of a country squire. It got so bad because of the

(*Concluded on Advertising Page* 16)

American Valuation for Imports Subject of Hearing on Jan. 20

WASHINGTON, Dec. 20.—Possible changes in the method of assessing tariff duties on iron and steel and other products will be considered at a hearing to be begun before the Tariff Commission on Jan. 20. The hearing has been announced by the commission and is to be held at the direction of President Hoover. It will relate particularly to the extent to which values in the United States may properly be used for assessing duties.

The President asked that an investigation be made by the Tariff Commission of schedules due to depreciation of currencies in foreign countries. He included the iron and steel and metal goods industries in a list of 16 which were furnished by the Department of Commerce, together with localities where there had been an actual increase of unemployment.

The President, in a letter to Chairman O'Brien, of the Tariff Commission, on Oct. 24, urged expedition of the inquiry because of the growing unemployment. He pointed out depreciated currencies abroad had reduced the standards of living in those countries and greatly widened the difference in the cost of production between the United States and such countries.

Suggested changes of fixing the basis of valuation were made by the President.

"If it shall prove that the differences in cost of production between here and abroad in these industries have altered the basis of the tariff duties, I wish to receive recommendations of the Tariff Commission at the earliest possible moment," the President told Chairman O'Brien.

The principal basis now used in fixing duties under the American tariff system is that of foreign value. American interests seeking the protection contemplated by the Hawley-Smoot act, but greatly weakened on imports from countries with depreciated currencies, are especially desirous of having duties fixed on the American value. This is the selling price in the United States of the domestic article upon the value of which the duty is to be assessed. Coal tar products are imported on this basis. Another method of assessment is on the domestic value. This is the selling price in the United States of the imported article, duty and other charges. Still another method that could be turned to is based on the landed cost. This is used by many foreign countries. It is the cost landed at the dock in the importing country and includes the foreign price plus transportation and other charges to the country of importation.

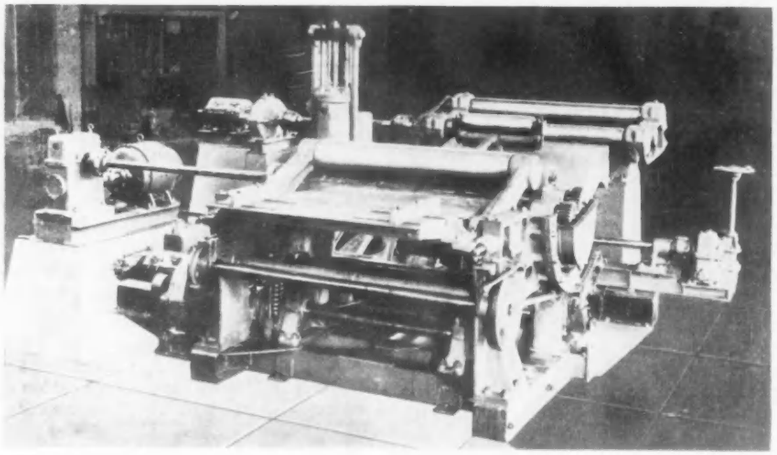
The bulk of steel imports, however, does not come from countries having depreciated currencies and changes in duty evaluation would not affect them. The chief complaint against most of the steel imports is that they are produced by extremely cheap labor and it is also charged they are being dumped.

British Steel Output Gains, Pig Iron Off

LONDON, ENGLAND, Dec. 17 (*By Cable*).—Production of steel ingots in the United Kingdom rose to 473,800 tons in November from 438,500 tons in October, but pig iron production declined to 267,700 tons from 275,600 tons in October.

Monthly totals for all of 1931 and for 11 months of this year follow:

1931	Pig Iron	Steel Ingots
Jan.	337,200	402,200
Feb.	318,200	486,400
March	357,100	500,100
April	323,200	397,400
May	346,500	435,100
June	323,800	428,900
July	317,000	428,700
Aug.	275,700	375,300
Sept.	248,200	400,500
Oct.	284,200	457,400
Nov.	296,400	459,200
Dec.	330,600	422,400
	3,758,100	5,193,600
1932		
Jan.	332,400	429,700
Feb.	318,100	480,600
March	335,600	462,800
April	316,900	433,300
May	315,300	416,900
June	311,400	459,300
July	292,600	430,300
Aug.	259,400	361,500
Sept.	260,400	430,300
Oct.	275,600	438,500
Nov.	267,700	473,800



Magnetic Uncoiler for Strip Steel

A MAGNETIC uncoiler for cold-rolled strip mills, which will handle heavier and more difficult work than a mechanical uncoiler, has been invented by H. H. Talbot, chief engineer of the United Engineering & Foundry Co., Pittsburgh, and brought out by that company.

A wide, heavy-gage, hot-rolled coil is delivered to the magnetic uncoiler by a crane or other transporting device and is laid upon a pair of horizontal carrier rollers with a magnet between them. The rollers are revolved until the outer end of the strip rests directly over the magnet, which holds this end tightly while the two rollers tilt forward and roll the rest of the coil down an incline into a coil box. About 10 ft. of the strip is unrolled in this manner and unbent out of its curl. The magnet then lets go, the coil box rollers are revolved and the loose end of the strip sweeps in an arc over the coil to a set of open revolving, straightening rollers, which are immediately closed and commence to straighten and feed the strip neatly into the entry guides of the cold mill. A following coil is laid upon the carrier rollers of the magnetic uncoiler as soon as the first coil rolls into the coil box, so that it can be unrolled immediately after the last end disappears into the mill. The magnetic uncoiler has operated successfully under commercial conditions.

Belt Sander with Single High-Frequency Motor

USE of a single high-frequency electric motor features the belt sander, illustrated, which has been added to the line of the Buckeye Portable Tool Co., Dayton, Ohio. This machine, designated as the Hercules model 352-E, may be used for smoothing down welds, sanding automobile bodies, smoothing large steel dies, and finishing metal, wood, and stone surfaces. It is suspended over the work by a cable, and is operated by one man.

The machine is air cooled by compressed air, which prevents entrance of dust or grit into the motor. Compressed air is used to obtain automatic belt tension. Use of a belt idler is said to make possible application of manufactured abrasive belts over an endless leather belt. Canvas-coated belts can be used, however, with the addition of guide rolls. The speed of the pulleys is 4500 r.p.m. A high-frequency cup wheel grinder for grinding weld seams, and for surfacing large castings, as well as for grinding dies and flat metal, is also made by company.

Rotary Displacement Pump of Novel Design

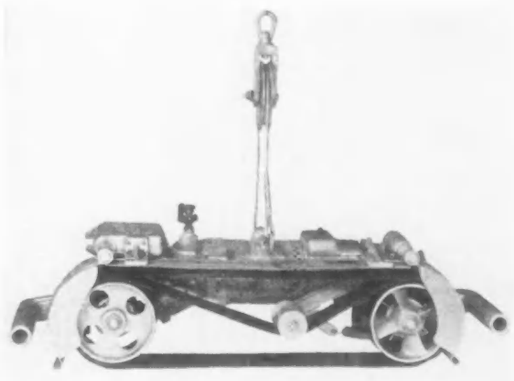
THE new type of rotary displacement pump illustrated in the photographs can run at speeds heretofore considered impracticable for displacement pumps.

Power is applied to a central or power rotor. This meshes with one or more sealing rotors of such form that they are propelled largely by fluid pressure, with a minimum of mechanical contact. This action results from the shape of the threads, those of the power rotor being convex, while those of the idler rotor are concave. This tooth form, which is patented, accomplishes sealing so effectively that numerous turns of the thread around the rotor, as found in common screw pumps, are not required in order to keep slippage to a small value. Efficiencies of 80 to 90 per cent have been obtained on tests.

The velocity of the liquid through the pump is low and without trapping of liquid in tooth pockets. Largely because of this, the pump operates quietly at the higher motor speeds, and even at turbine speeds.

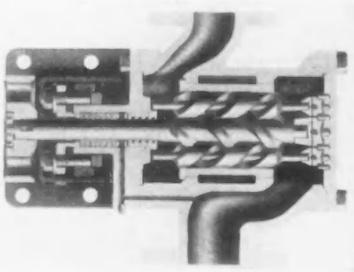
There are only three moving parts, and except for small thrust buttons to maintain the relative axial positions of the rotors, no separate bearings are used, nor are pilot gears required. Only one stuffing box is necessary.

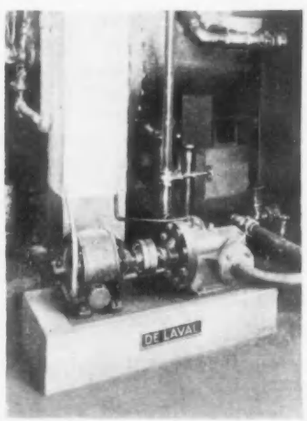
The pumps have been developed by the De Laval Steam Turbine Co., Trenton, N. J., and are known as De Laval-IMO pumps. They are available in capacities ranging from ½ to 700 gal. per min., and for pressures up to 500 lb. per sq. in. Pumps for higher pressures and capacities can be supplied.



The high-frequency motor that drives the belt sander at left is air cooled

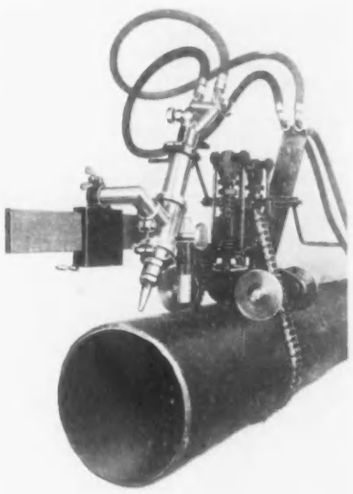
The De Laval-IMO rotary displacement pump in lubricating oil system is shown at right. Arrangement of parts may be seen in sectional view below





Portable Machine Cuts and Bevels Pipe by Oxy-Acetylene Process

PORTABLE equipment for cutting off and beveling pipe to the desired angle for welding has been added to the line of the Air Reduction Sales Co., 60 East Forty-second Street, New York. This machine is designed for use on wrought iron, steel and galvanized pipe ranging in diameter from 4 to 30 in. It cuts and bevels accurately in one operation;



pipe ends are square with the pipe axis, and are free from burrs, slag and scale.

Arrangement of this cutting unit, designated as the Airco style No. 1 beveling machine, may be seen in the illustration. A light four-wheel carriage carries a crank-driven chain sprocket and a bracket that supports the oxy-acetylene cutting torch. The carriage is held against the pipe by a roller chain which surrounds the pipe and engages the sprocket, as shown. The sprocket is supported by coil springs and when rotated by the hand crank, it develops sufficient frictional grip to rotate the pipe when the latter is free to turn on dollies, or to rotate the machine itself around the pipe when the pipe is fixed in position.

The cutting torch is adjustable on the bracket to any angle from the vertical (for cutting off square) to 45 deg. more or less, for beveling. The torch is also adjustable laterally to produce the lead cutting angle necessary on bevels for clean cuts free of slag. This angle varies slightly with the pipe diameter and wall thickness.

To set up the machine for pipe beveling, the chain is adjusted to the approximate length required, and the ends then linked together. Next, the chain is tensioned by compressing the coil springs that support the sprocket shaft, this being accomplished by pushing two cam levers. The machine is then rocked back and forth to straighten the chain and aline the wheel axles parallel with the pipe. With the torch thus adjusted for bevel and lead angles and positioned for cutting, the cut is started and maintained by turning the hand crank.

Chain of correct length for 12-in. pipe is furnished. Detachable slip links facilitate fitting the chain to pipe up to this diameter. Additional chain is obtainable for diameters up to 30 in. The machine is rugged to withstand hard usage in the field. It weighs 50 lb. and may be handled and operated by one man.

Applications include cutting out of faulty welds or old screwed couplings, leaving the pipe ends beveled for welding. This is done with two torches, one set at each side of the coupling. The machine may be used also for making fittings on the job from short ends of pipe and for cutting out weld coupons for test.

Lowers Hoist Under Time and Speed Control

WHAT may be described as a hoist whose principal function is to lower its load rather than to lift it is used in a prominent factory that specializes in the manufacture of zinc covers for jars and bottles. The zinc is cast in molds and at the beginning of the casting operation these molds are in a horizontal position. The hoist hook is attached to the mold, and as the pouring continues the mold is slowly lowered and rotated about a hinge to a vertical position. The cross-section of the hot metal surface exposed to the air decreases as the mold is swung from the horizontal to the vertical position, and also as it is desirable to have a fairly uniform rate of pouring the electric hoist is required to lower the mold at varying speeds during variable time intervals.

The hoist was built by Robbins & Myers, Inc., Springfield, Ohio. An electrical cycle timer is incorporated in the control equipment, arranged with four speeds by means of resistance being cut in to give dynamic braking control. The motor is compound wound for a full load speed of 750 r.p.m. The cycle of work is started by pressing the lowering button and the motor operates at a speed of 85 r.p.m. for a period of 35 sec., at which time the timer cuts in the second speed which increases the motor speed to 150 r.p.m. After an interval of 8 sec. the motor speed is increased to 300 r.p.m., which remains on for 4 sec., when the final full load speed of 750 r.p.m. is reached, and this speed continues for a period of 19 sec. At the end of this period the control automatically shuts off the motor.

The hoist is equipped with a magnetic brake, of the shoe type, and also an electrical upper limit switch of the block contact type. The magnetic brake is mounted upon the outer end of the hoist motor and is on the opposite side of the hoist from that shown in the photograph. The left-hand cabinet houses the cycle timer while the other cabinet contains the reversing contactors and also the accelerating contactors and resistance.

The push button station also has, in addition to the lowering button, a hoisting and a stop button. The hoisting button actuates a reversing contactor, but this only gives single high speed and is not connected to the cycle timer. This enables the hook to be quickly brought up to operating position for handling another mold. The stop button is used to stop the motor in either direction in case of emergency. When the stop button is pressed while the lowering cycle is being performed the timer mechanism resets itself to its original or starting position and is ready again to go through its cycle when the lowering button is pressed. The extra push button shown immediately above the handle is for lowering the light hook by a separate circuit as the weight of the block is not sufficient to obtain dynamic braking control.

Special control equipment is now available to enable a hoist to perform a great variety of functions and to meet service conditions hitherto thought impossible, says C. E. Schirmer, chief engineer, Hoist and Crane Division of the company.

Fiftyone iron mining companies and ore owners in Minnesota have been denied a petition for a 20 per cent reduction in assessed valuation of unmined ore.

Malleable Founders Discuss Price Stabilization and Rate Setting

A GROUP plan of scientific rate setting for the malleable foundries that are members of the Malleable Iron Research Institute, was discussed at the annual meeting of the institute held at the Hotel Cleveland, Cleveland, Dec. 14, and the appointment of a committee was authorized to make a study of the matter. The plan was proposed by T. M. Harrison, of Stevenson, Jordan & Harrison, industrial engineers, Cleveland, who explained the proposed rate setting methods which are used individually in some gray iron foundries, but which heretofore has not been applied to an industry as a group.

The plan of rate setting proposed by Mr. Harrison covers molding and core making and the purpose is to reduce and control the direct labor cost and to provide a basis for standard cost finding and also a basis for accurate estimating. Instead of making time studies for individual patterns, the plan provides for time studies to cover elementary operations which combined comprise all the operations in making mold or core. These elementary time studies are made only once, and, after the basic rates are established, an overall time allowance is built up by combining the various operations to cover the making of a mold from any pattern in any flask.

Price Stabilization Discussed

Stabilization of prices was another topic considered and, after being freely discussed, was referred to a committee. The discussion was preceded by a talk on stabilization within the law by R. E. Sommer, Deahl & Sommer, Cleveland. All malleable foundries are interested in getting prices on a stable basis, he declared, and economic pressure will force a change from present conditions. First, there must be a real desire on the part of executives to correct the unsatisfactory price situation. Conditions are not improved by the failure of a plant that sells its product below cost. Someone buys the plant and there is a new competitor who has the advantage of a low overhead because he has bought the plant at a low price. Normal business at present prices would not help. Over-production causes a weakening of the price structure.

There is a legal cure for unprofitable prices, the speaker declared. This will be found in the exchange of information regarding prices and the volume of business, thus taking away the secrecy about cut prices. However, a price reporting service is not a cure-all. Things that foundries may do legally to strengthen the price structure, the speaker said, include making reports of current market information, agreeing not to sell below cost, coordinating sales through a new selling organization and in some cases by the effecting of mergers.

Declares New Uses for Malleable Iron Should Be Found

A review of some of the problems of the malleable industry and its future outlook was presented by E. E. Griest, president of the institute. It is hopeless to establish a general stabilization plan until there are more members in the institute, he declared, although much can be accomplished. The membership should be increased so that some plan can be adopted that will be effective in that its operation would enable malleable foundries to get fair prices. New uses for malleable castings, he said, should be developed that would help the malleable industries. Among new uses which he said should be made institute projects are automobile crank shafts and cam shafts, some of the latter having already been made of malleable castings. The institute, he said, should also sponsor high-strength malleable iron.

Plant values as related to county, State and Federal taxes was the subject of a paper by R. E. Belt, secretary of the institute. He recommended the writing off of parts of a plant and equipment that are idle and for which there may be no future need. Both property values and cost of production, he maintained, should be based on present-day values of only such a part of the plant and equipment that can be expected to be operated in the future. This would result in lowering State and county taxes and State franchise taxes and in lower insurance cost where there is an over-coverage. It would also permit a reduction in future depreciation charges and more accurate statements of earnings.

A report of the brake drum group, now consisting of nine members, which is having an extensive series of tests made on the use of malleable iron for brake drums, was made by J. C. Haswell, Dayton Malleable Iron Co., Dayton, Ohio. He said that no conclusions have as yet been drawn from these tests, but he hoped that they would result in the adoption of malleable iron for brake drums.

Wearing properties of malleable iron and other technical subjects were discussed by Enrique Touceda, consulting engineer of the institute.

Predicts More Extensive Use of Malleable Iron by Railroads

Activities of the institute during the past year were reviewed by Mr. Belt. Over 100 new parts have been cast in malleable iron during the year, which, he said, shows what can be done in extending the market. He predicted a more extensive use of malleable iron by railroads when they become more active buyers of equipment. Thirty-two bulletins on various topics were issued during the year and the technical departments of 71 colleges were supplied with malleable iron castings for testing purposes. A paper on malleable iron was prepared for the use of students. In spite of the depression, the institute maintained its membership during the year, the loss of two members having been offset by the addition of two new members.

E. E. Griest, vice-president, Chicago Railway Equipment Co., was reelected president and chairman of the board. S. E. Doster, president, Superior Malleable & Steel Casting Co., Benton Harbor, Mich., and Frank O. Parker, Acme Steel & Malleable Iron Works, Buffalo, were elected vice-presidents. R. E. Belt was reelected secretary and treasurer. Three new directors were chosen for three years, these being D. O. Thomas, Saginaw Malleable Iron Division, General Motors Corpn., Saginaw, Mich.; Frank S. O'Neil, Link-Belt Co., Indianapolis, and O. J. Cessna, Albion Malleable Iron Co., Albion, Mich.

Reading Brings Out New Bar Iron

The Reading Iron Co., Reading, Pa., has brought out a new special-grade bar iron which it has designated as Nordic. This iron is recommended for service where resistance to shock, vibration and fatigue is vital. For such use, it is said, a tough wrought iron will outlast steel of considerably higher tensile strength. The toughness and ductility of Reading Nordic iron is stated to equal that of the finest foreign and domestic bar irons, while its tensile strength is reported to be somewhat higher than that of imported irons. The new iron possesses free welding qualities and can withstand, it is asserted, considerably higher temperatures than can be employed in heating and welding steel.

Steel Corporation To Consolidate Warehouses

The United States Steel Corpn. has decided to consolidate its steel jobbing business, now conducted by the Illinois-Scully Steel Warehouse Co., by transferring to it similar operations now conducted by Carnegie Steel Co. The name of the Illinois-Scully Steel Warehouse Co. probably will be changed to indicate more clearly its relation to the Steel Corporation.

The change will be effected not later than Jan. 31, 1933. Charles Heggie, now president of Illinois-Scully Steel Warehouse Co., will continue as president of the enlarged company.

Balancing the Budget Supersedes War Debts as a Major Problem

BY DR. LIONEL D. EDIE

THE war debts will now give way to domestic politics as the center of popular concern. And among all the tasks facing the present session of Congress, none exceeds in importance the balancing of the national budget.

Business men have more at stake in the budget problem than the mere question of whether taxes shall increase, and if so, in what form. They face a period of hesitation in demand, which in turn is a reflection of the stagnation in bank credit and the arrested development of the corporate bond market. This static situation is perpetuated by the inability of the Federal Government to fund its heavy floating debt in a long-term issue. This inability, in turn, is due to the uncertainty of the whole money and capital market about the soundness of Federal finances. To release merchandise markets, to put excess credit to work, to restore confidence, it is necessary to put the national fiscal affairs in order.

Confusion About the Budget

As soon as any one tries to understand the budget, he runs into all sorts of difficulties. He finds there are several budgets. Which one is to be balanced?

There is a budget of appropriations and a budget of expenditures. They differ by several hundred million dollars. It is the latter which is meant when it is said that the budget must be balanced.

There is a budget of ordinary expenditures and a budget of extraordinary expenditures (the latter principally R.F.C. funds and Federal Land Bank funds). Balancing the budget refers to the former.

But not to all of it. Mr. Hoover excludes sinking fund of $534,070,300 from the ordinary budget which he proposes to balance.

Hence, the fiscal budget which official figures are calculated to balance is expenditures, less R.F.C. funds and other emergency funds, and less sinking fund. This net budget, assuming adoption of recommended economies, amounts to $3,256,000,000. This is *the budget* which official Washington proposes to balance.

It is the fashion right now among many people who style themselves as liberal to criticize the basic idea of a balanced budget on the ground that it is deflationary. They say it cuts wages and salaries and other public outlay and so destroys purchasing power and lowers prices still further.

How far at the outside might the Government go in making concessions to this point of view, without endangering public credit? I am not advocating the following concession, but I admit that a fair argument can be made out for it. *The budget* contains a substantial sum for public works, which are a capital outlay and which might conceivably be shifted over to the extraordinary budget and met by borrowed money. Perhaps $300,000,000 could be shifted in this manner, leaving $2,956,000,000.

This is the irreducible minimum, the absolute lowest figure which the Government ought by any stretch of the imagination to take as the budget to be balanced. This is on the basis of President Hoover's proposed economies.

These economies are not as drastic as they ought to be, but inasmuch as they are probably more drastic than the lame-duck Congress will adopt, we need not enter that realm of controversy for the present.

Failure to meet these minimum requirements would likely impair confidence in the Federal credit. Raising sufficient taxes to meet this budget is not deflationary and even the so-called liberals could hardly object to such a minimum program. I should much prefer to see the Government reject the distinction demanded by the self-styled liberals, and pay for public works as we go along. I believe the effect on restored confidence would far more than offset all other considerations. I consider the deflationary talk misguided. We have already gone far enough when we eliminate R.F.C. funds and the sinking fund from the budget that is to be balanced. But we cannot always get in full what we want in this topsy-turvy political world, and so for a temporary emergency we might be able to preserve public credit even though public works were to be treated as a capital outlay and to be met by further borrowings. But that is the limit.

The Income Side of the Equation

Last year the official estimates of tax revenues were so bad that the public will have none too firm confidence in the estimates for the new year. But just as one gets in the frame of mind to forgive and forget the past, one receives the shock of finding war debt payments counted by the Treasury in full as income. Is anybody so credulous as to expect this $328,000,000 actually to be received in the coming fiscal year?

This is the only palpable and obtrusive blunder. Otherwise, the estimates of amounts to be yielded by the various forms of taxes seem this year to be fairly realistic. They necessarily involve guess-work, but my own calculations suggest that the estimated yields from income tax and from internal revenues and customs are a fair guess in light of present available information.

As estimated by the Treasury, estimated receipts, excluding war debts, for the year ending June 30, 1934, total $2,463,769,188. This leaves a deficit from the above irreducible minimum budget of $493,000,000.

To make up this deficit, the President proposes to renew the gasoline tax ($137,000,000) and to pass a sales tax of 2¼ per cent ($355,000,000).

A beer bill would be an inadequate substitute for a sales tax, because it would raise probably only about half the sales tax estimate.

The important necessity is to bridge the gap of nearly $500,000,00 by some form of added revenue, or by some form of further economy. This measures the size of the task confronting Congress. This is *in addition* to the $478,000,000 of economies already demanded by the President.

The Minimum Program

What is the minimum program which business men should get behind? It seems to the writer to consist of the following points:

1. The limit of concession to the anti-deflationary point of view is to shift $300,000,000 of public works from ordinary expenditures to extraordinary.

2. The Government should restrict further borrowing to such public works, plus the needs of the R.F.C. and other purely emergency needs. This will probably mean increasing public debt by a billion dollars.

3. The treatment of war debt receivables as income is a "joker" in the budget.

4. With no new economies and with no new tax revenues, the deficit on the ordinary expenditures after revision for public works, would be nearly $1,000,000,000 in 1933-34. The Hoover plan calls for meeting about half of this by economies and about half by gasoline tax and sales tax.

5. The business man's emphasis should be on deeper economies than those requested by the President. If these are effected, and if a beer tax is adopted, a sales tax would be unnecessary, or if adopted its rate could be low and it could be used as a substitute for some of the nuisance taxes.

... PERSONALS ...

JOHN W. MACMORRIS, for the past nine years factory manager of the Skayef Ball Bearing Co., Hartford, Conn., has assumed a similar post with the Norma-Hoffman Bearings Corpn., Stamford, Conn. Previous to the Skayef connection, he was with the Mercer Automobile Co., Trenton, N. J., first as superintendent and later as factory manager. Mr. MacMorris has had a long and varied experience in the metal-working industry including six years as superintendent of the S. W. Card Co., Mansfield, Mass., maker of taps and dies; two years as superintendent of the C. W. Wirt Electrical Co., Germantown, Pa.; and six years with the National Cash Register Co., Dayton, Ohio.

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HARRY HARDWICKE, formerly Chicago district manager of sales of the tool steel division of the Ludlum Steel Co., has been appointed sales executive of the Ziv Steel & Wire Co., Chicago, effective Jan. 1. He was identified with the Ludlum company and its subsidiary, the Atlas Steel Corpn., for 17 years.

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E. W. SAUNDERS has been made Cleveland district representative, with offices, at 10465 Carnegie Avenue, for the Poldi Steel Corpn. of America, New York.

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NELSON B. GARDEN has returned to H. W. Swoboda, Inc., Pittsburgh, consulting electrical and mechanical engineer, in connection with heating and engineering problems.

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HENRY M. WOOD has been appointed Cincinnati representative for the hoist division of Robbins & Myers, Inc., Springfield, Ohio. He will make his headquarters in the Times Star Tower Building.

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WILLIAM G. GRAY, who has been identified with the American Iron and Steel Institute and the former American Iron and Steel Association since 1887, has retired, effective Dec. 31.

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MYRON C. TAYLOR, chairman, United States Steel Corpn., has sailed for England to spend a few days on business. He will return Jan. 3.

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HENRY D. SHARPE, president and treasurer of Brown & Sharpe Mfg. Co., Providence, R. I., has been elected president of the New England Council, an organization to stimulate and coordinate action with respect to economic problems of the New England states.

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RALPH E. FLANDERS, manager of the Jones & Lamson Machine Co., Springfield, Vt., last week spoke at the annual district meeting of the American Gear Manufacturers' Association in Boston.

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GEORGE W. HOWE, for several years associated with the Wico Electric Co. and the Package Machinery Co., both of Springfield, Mass., has been appointed to the faculty of Northeastern University.

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KENT S. CLOW, vice-president, James B. Clow & Sons Co., has been elected president of the United Charities of Chicago.

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WERNER TROEGER, export manager, Harnischfeger Corpn., Milwaukee, has returned home after spending 18 months visiting various European countries on business.

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RALPH E. MOODY, assistant to the president, Milwaukee Electric Railway & Light Co., has been appointed vice-president and general manager Wisconsin Michigan Power Co., Appleton, Wis., an associate affiliate of the North American Co., to fill the vacancy caused by the resignation of A. K. ELLIS. WILLIAM E. SCHUBERT, chief engineer, Wisconsin Michigan company, has been given additional duties as assistant general manager. Both are graduates of the College of Engineering, University of Wisconsin.

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HERMAN A. WAGNER, president, Wisconsin Bridge & Iron Co., Milwaukee, has been reelected president, Milwaukee Employers' Council. WALTER C. LINDEMANN, vice-president, A. J. Lindemann-Hoverson Co., was reelected vice-president. Directors include THEODORE TRECKER, president, Kearney & Trecker Corpn.; JULIUS J. GOETZ, president, Western Metal Specialty Co., and ROY M. JACOBS, president, Standard Brass Works.

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HUGH MORROW, president, Sloss-Sheffield Steel & Iron Co., has been elected president of the Alabama Mining Institute for the sixth successive term. W. H. OLDHAM, vice-president of the Republic Steel Corpn., in charge of Southern properties, has been elected a director of the institute. One of the hold-over directors is L. E. GEOHEGAN, vice-president and general manager of the Gulf States Steel Co.

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CHARLES E. FRENCH has resigned as secretary and treasurer of the Cadillac Machinery Co., Fisher Building, Detroit, after having served in that capacity for the past 10 years. C. L. CAMPBELL, president and general manager, will announce a successor to Mr. French in January. Present directors are G. L. HAWN, THOMAS REDMOND, BERNARD J. RIORDAN, JOHN M. RIORDAN and Mr. CAMPBELL.

R. F. C. Loan for Chicago Water Pumping Station

WASHINGTON, Dec. 20 — Approximately 5000 tons of cast-iron pipe will be required for a new pumping station for Chicago, for which the Reconstruction Finance Corporation has approved a loan of $2,327,000. The project also will call for materials for a building, six 50,000,000-gal. capacity operated centrifugal pumps and chlorination equipment. Work will be started Jan 3. The Finance Corporation also announced a loan of $55,000 to Newark, N. J., for the construction of a public market.

Bethlehem Shipbuilding Low on U. S. Cruiser

WASHINGTON, Dec. 20.—The Bethlehem Shipbuilding Corpn. was low bidder on cruiser 39, requiring from 6000 to 8000 tons of plates. The low bid for a drydock caisson at the Norfolk, Va., Navy Yard was made by the Dravo Contracting Co. The caisson will call for about 1200 tons of plates.

Pike & Cook Co., Inc., Minneapolis, submitted the lowest supplementary bid for the Appraisers' Stores, Baltimore, requiring about 1400 tons of structural steel. For a building with other types of stone, the lowest bids were submitted by Sinclair & Grigg, Philadelphia.

El Capitan Dam Will Need 15,000 Tons of Pipe

WASHINGTON, Dec. 20. — Approximately 15,000 tons of cast iron or steel pipe will be required for completion of El Capitan dam, for which the Reconstruction Finance Corporation has approved a loan of $2,350,000 to San Diego, Cal. The project consists of the dam, 25 miles of pipe line and a filter plant. Six miles of the line will consist of 48-in., and two miles of 36-in. pipe. Another self-liquidating loan, amounting to $22,000, was made to Tyboo Water Works, Savannah Beach, Cal. It will be used for the purchase of approximately 300 tons of cast iron pipe and a 100,000-gal. elevated tank.

Standard Gas & Electric Co.'s preliminary construction budget for 1933 will total $12,474,753 for public utility companies in the system, according to John J. O'Brien, president of the company.

OFF THE ASSEMBLY LINE

Automobile Production Rises Sharply; Ford and Chevrolet Purchase Steel

Detroit, Dec. 19.

DETROIT probably has the distinction of being the busiest industrial center in the country today. Automobile production took a sharp upward turn the past week, and indications are that assemblies this month not only will go over the 100,000 mark, but also may equal the 123,973 units of December, 1931. At least it can be conservatively predicted that the minimum to be expected is 110,000 cars.

This acceleration of activities has been directly felt by the steel industry. Perhaps its most spectacular effect has been the operation of Great Lakes Steel Corpn. at 100 per cent of ingot capacity during the past week and the lighting of a Zug Island blast furnace of the Hanna Furnace Corpn. to supply hot metal to the Great Lakes open-hearths. There is a possibility that one of the Great Lakes furnaces may come off a long run within a few days, but apparently it is the intention to keep five of the six furnaces in operation until the year-end, or longer. It should be remembered, of course, that the ingot making capacity of Great Lakes is less than its finishing capacity, when the Michigan sheet mills as well as the Great Lakes bar and hot strip mills are taken into consideration.

Great Lakes Steel Corpn. is operating at 100 per cent of ingot capacity.

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Ford has purchased steel for 40,000 bodies.

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Chevrolet has bought steel for 40,000 cars. Fisher Body will buy sheets for its Cleveland plant this week.

Ford Buys Steel for 40,000 Bodies

The Ford Motor Co. has bought steel for the first 40,000 bodies of its new line, which are to be made by the Briggs Mfg. Co. and Murray Corpn. Of this amount, enough tonnage for 10,000 bodies is to be delivered immediately. It is believed that further steel purchases, including sheets and strip steel, will be made by Ford before the end of the month. The Rouge plant is now starting production on this new car, which Mr. Ford said recently his company intended to make. It is understood that the car, still a V-eight, will have a wheelbase of 112 in. and that bodies will be larger and more stream-lined than at present. It is notable that Ford has led in passenger and commercial car sales in every month since June, when volume deliveries of the current V-eights began. In the period from January, 1927, to and including October, 1932, Ford sales totaled 4,001,384 cars, the largest in the industry, despite the fact that the company was out of the market twice during that time for change of models, having been idle five months on one occasion and seven months on the other. Murray is operating its Ecorse frame plant intermittently on Ford frames. Many Ford suppliers are expecting releases on orders during the next few weeks.

Chevrolet Buys More Steel

Chevrolet has placed steel for an additional 40,000 cars for its Flint and its local plants, and this week Fisher Body Corpn. will buy sheets for its Cleveland plant devoted to the building of Chevrolet bodies. This entire buy for Chevrolet purposes will amount to about 40,000 tons and is for January delivery. Chevrolet has stepped up its output and will make at least 55,000 cars this month and perhaps 60,000. Assembly plants, when they can get enough bodies, are working six days a week. On an 110-in. wheelbase, the 1933 Chevrolet six has a larger, lower body, no-draft ventilation, a 65-hp. motor with piston displacement of 206.8 cu. in., a leaning, V-type radiator, the shell of which harmonizes with the color of the hood, skirted, deep-crowned fenders, and a starterator whereby the usual starter button is eliminated and the motor is started by the driver's depressing the foot accelerator. An octane selector, which makes it possible to get the maximum usage out of any kind of gasoline, is a feature. The engine rests on a newly-designed sub-frame, with four points of support, the whole of its weight being carried on two lateral supports so located that the motor is balanced on its center of gravity. This method anchors the engine to the frame at its point of minimum movement.

The Chevrolet radiator grill is stamped as an integral unit. The running board and apron also are stamped as a single piece, eliminating the joint which formerly permitted the formation of rust. The crankshaft has been increased 10 lb. in weight to 63½ lb. Rigidity of the axle shaft is increased by the use of a double taper construction; its wheel hub is now forged integral at the outer end, resulting in a stronger structure.

Chrysler Units All Busy

Chrysler Corpn. is expected to make about 30,000 cars this month, of which 18,000 will be Plymouths. All of its car manufacturing divisions are now in production. Chrysler probably will award its first quarter steel contracts this week.

The Hudson Motor Car Co. is dropping the Essex name entirely in 1933 and will offer a Terraplane six and eight and three Hudsons, a super-six and two eights. The Terraplane eight and Hudson super-six will be on an 113-in. wheelbase. The latter will have an engine head the top half of which is aluminum and the lower half cast iron. The narrow tread of the Terraplane six will be dropped in

favor of a larger, standard tread. Pontiac will have a straight eight with an 115-in. wheelbase at an exceptionally low price. Auburn will present three lines of straight eights and twelves, while Studebaker will have, among others, an eight-cylinder, 100-hp. Commander at about $1,000.

Willys-Overland is preparing a Willys 77 and Willys 99 to be termed "New Era" cars, with sloping hood, shrouded fenders, floating power, disk wheels with radial indentations to eliminate the noise of the old-fashioned, solid disks, and steel construction throughout the body, including doors, pillars, sills, cross members and floor panels. Lamps are built into the front fenders and the spare tire is fitted into a recess in the back of the body, an innovation on American cars. The car's design shows more of a European influence than probably any other 1933 car.

Prices Not Greatly Changed

Chevrolet's prices have not changed substantially from those of the past year, starting at $485 for the sport roadster and going up to $565 for the cabriolet and the sedan. Plymouth offset the Chevrolet debut by reducing its prices $30, placing them $90 under the schedule which prevailed until early in November. The Plymouth sedan is now $545 against $565 for Chevrolet's, the sport coupe is $525 compared with $535 for Chevrolet's, and the Plymouth and Chevrolet business coupes are both $495.

John N. Willys has declared that prevailing prices are still far out of line with declines in other commodities, and a sensationally low price on the new Willys is anticipated. Then Continental will offer a low-priced four in addition to its two sixes. Other entries before the spring season gets under way are sure to make it possible for the motorist to buy a small car for a base price of about $350.

Large Machine Tool Orders Placed

Further sizeable machine tool orders have been placed by a prominent automobile company in the past week. Others will follow in the next few weeks until a total of about $1,200,000 to $1,500,000 has been expended for the purchase of new tools and the rebuilding of old ones and for jigs, fixtures and other tool accessories. The largest order has gone to a Detroit machine tool builder, but the bulk of the business is being distributed among companies in various centers. This motor car maker likewise is expending about $500,000 for dies which it has designed and which are being made mostly in local shops.

Ford is having steel billets in stock at Rouge rolled by the district steel mill as the tonnage is needed. There is considerable discussion as to whether Ford will start its steel plant when this supply is exhausted, the consensus of opinion being that steel can be purchased at today's prices much cheaper on the open market than it can be made at Dearborn.

Continental's announcement that it will sell its new four direct to the consumer through "Continental Terminals" or distributing centers and that "tested and tried methods of mail order selling also will be employed to obtain penetration into the smaller towns and rural areas" has aroused much interest and its application will be followed closely by the industry. However, no other company is contemplating a similar step.

January automobile production should at least maintain December's gait and probably will surpass it by a comfortable margin. Demand for steel should be sustained at about its present rate during the next 30 days, with Chevrolet and Plymouth providing the bulk of the tonnage and Ford becoming an increasingly important factor.

... OBITUARY ...

ANDREW THOMPSON, vice-president and general manager of the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., died suddenly at his home in Buffalo on Dec. 8, aged 55 years. After his graduation from Princeton University in 1899, he entered the employ of the Embossing Co., Albany, N. Y., of which he was president at the time of his death. Mr. Thompson became identified with the Titanium company as vice-president and general manager in 1912.

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JOSEPH E. BACHELDER, formerly vice-president of the Fairbanks, Morse Water Supply Co., Chicago, died Dec. 12 of heart disease. He was born at Palmyra, Me., in 1857. He was connected with the Deane Steam Pump Co. and the International Steam Pump Co. from 1888 to 1901. In the latter year he joined the steam pump department of Fairbanks, Morse & Co., and became general sales manager of the department soon afterward. He retired from business in 1931.

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NICHOLAS M. GRIFFIN, formerly vice-president of the central division of the Mack Truck Co., died Dec. 13 of a heart attack at Milwaukee. He was 62 years old.

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CLEM H. HOPPE, president of the C. H. Hoppe Foundry Co., Chicago, died Dec. 15 at Barrington, Ill. Mr. Hoppe was 53 years old. He organized the foundry company which bore his name in 1926.

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A. E. BARLOW, vice-president and sales manager of the Moto Meter Gauge & Equipment Corpn., Toledo, Ohio, died Dec. 12 while on a visit to Detroit. Mr. Barlow, who was 58 years old, made his headquarters at Toledo. He was formerly a resident of Chicago.

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CLARENCE F. FAY, president of Abeel Brothers, Inc., iron and steel jobber, New York, died at his home at White Plains, N. Y., on Dec. 19, aged 53 years.

P. M. SMITH, for the past seven years Pittsburgh district sales manager of the Treadwell Engineering Co., Easton, Pa., died at his home at Mt. Lebanon, Pa., on Dec. 10.

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ARTHUR B. JOHNSON, formerly identified with the sales department of the Standard Steel Car Co., Pittsburgh, died at Miami, Fla., on Dec. 18, aged 59 years.

Boatload of Scrap Goes to Detroit From Milwaukee

A shipment of about 1400 lb. of scrap plate was loaded on the steamer Henry Cort at the municipal docks in Milwaukee the past week by the Midland Steel & Equipment Co., 610 West Michigan Street, Milwaukee, for customers in the Detroit district. The scrap represents the purchase by the Midland company from the A. O. Smith Corpn., Milwaukee, of approximately 5000 new automobile frames, surplus stock, now obsolete. The consignment, amounting to 56 carloads, was shipped to the municipal dock by rail and there reduced to scrap before loading for water shipment to destination.

Brewery Places Order For Steel Tanks

The Buffalo Tank Corpn., Buffalo, N. Y., has been awarded what it believes to be the first sizable contract let in anticipation of the return of beer. It will fabricate storage tanks and equipment to cost $40,000 for the American Brewing Co., Rochester, N. Y. Several hundred tons of steel will be required. The tanks will be manufactured in the plant of the Buffalo Tank Corpn. at Lackawanna, N. Y., and will be coated on the inside by Henry Gusmer & Co., New York.

Many representatives of leading technical and scientific societies attended a recent meeting at the University Club, New York, in commemoration of the 125th anniversary of the founding of John Wiley & Sons, Inc., New York publisher.

• • EDITORIAL COMMENT • •

Wages Made by Markets

WHATEVER agreements the iron and steel trade or any part of it has had with labor unions have been based on the principle of the sliding scale. When prices of iron and steel went up, wages went up, and when market prices went down wages declined accordingly.

Only a small part of the industry has ever operated under definite agreements with unions, but steel manufacturers for years have advanced wages in good times, and when prices have fallen, particularly in times of panic or depression, wages have been reduced.

In the iron foundry trade also the molders' union has long recognized market conditions in its wage agreements. By limiting apprenticeships and, in the old days, by disciplining members for "overdoing" a day's work, the union held a tight rein, especially in its piece-work dealings with the stove manufacturers; but in the main good times (with market prices profitable) brought wages up and bad times put wages down.

In violently declaring for reduced working time with no reduction in wages, the American Federation of Labor has taken a stand against the principle underlying all conference relations between labor unions and manufacturers of iron and steel. All the more surprising is the action taken at the Cincinnati convention in view of the disastrous fall in prices of raw materials and manufactured products in every industry. Even now, after more than three years of depression, the hourly wage rate of industrial workers is nearly twice that of the years just before the World War. But here is the farmer, getting about half as much as in 1913 for what he produces. Today he cannot buy the products on whose sale many industrial workers must depend for employment and wages.

How does the American Federation of Labor expect the manufacturers of these products to increase their sales, or even to hold the present shrunken volume, if they must pay the 50 per cent advance in hourly wage rate for which President Green militantly contends?

Mr. Gompers announced after the World War that union labor proposed to hold all the advances it had won—many of them virtually the price of speeding up munitions production. But the recession of 1921 was not long in proving that wages are subject to the same forces that make the price of what the wage earner produces. Later, along with the new era preachment that American security values had been established permanently at high levels, came the new economics of high wages as creator and sustainer of prosperity.

Consumers know only too well what that fallacy has cost them in tribute to union labor in coal mines, in the building trades and in railroad service. They may wonder that the Federation of Labor has chosen this distressful time for its impossible demand. Or, on sober second thought, will the Federation decide that it is a demand that must not now be pressed?

The Sales Opportunity of Today

PARADOXICAL though it may sound, metal-working companies have never faced a greater sales opportunity than today when business is in the doldrums and apparently a slow recovery is the only way out. By opportunity we mean that the consumer's door is wide open as an invitation to the supplier to walk in and demonstrate his product. In prosperous times that opportunity was far more limited. The prospective consumer was too engrossed in filling orders to have time or inclination to experiment. Why bother with a change when everything was running along smoothly? Why invite trouble?

But trouble in the form of lack of orders came uninvited. The consumer has seen much of his former business slip away from him and has discovered that if it is not all to slip away, he must bestir himself. That he is doing as he never did before. He has seen some of his pet ideas and plans destroyed and has had to abandon others. He realizes that in the competitive struggle into which he has been plunged price will be a paramount consideration. He is putting the question mark to all materials and methods and is examining his production processes with microscopic care, searching for new ways to make his product just as good, just as efficiently, but MORE CHEAPLY.

In this search he has gone a step further than he ever did before. He now is as intent on seeking out the supplier with a material of proved worth as the supplier is in seeking him. There is mutual rather than one-sided interest drawing the two together. What a perfect setting for the supplier to sell his goods, to tell his story to a responsive audience and to clinch the business which is his if he is deserving of it.

Said the chief metallurgist of a large company recently, "We are not buying much material now, but we are searching, searching, searching for new products of quality which we can use when business picks up to manufacture our goods at less cost. We are using to capacity our research facilities for testing and developing materials and are eager to get new ideas, to hear about new products and to have new uses of old products brought to our attention. We are greeting suppliers with open arms, glad to secure from them whatever facts they may possess pertaining to their wares."

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Car Loadings Reassuring

IT is in this period of seasonal decline that freight car loadings make their more reassuring showing. The usual period of seasonal increase is from about the middle of July to some time in October, and this year, during that period, car loadings had a materially larger increase, figured on a percentage basis, than occurred in active times. Apparently this more than usual seasonal increase indicated

that there was increase also of a general character, promising to be lasting. But there was a flaw in the argument, in that in poor times seasonal increase in number of cars might be affected less than the stable movement, thus confusing percentage computations.

The period of seasonal decline now having been entered, the case is the other way. If the previous showing of increase was partly fictitious, the subsequent decrease would be particularly marked, but it is found that such is not the case. The decrease has not been as steep as usual. The really crucial test has been passed.

In other years the first week of December has usually been materially below the summer level, while this year there is a gain. For 15 consecutive weeks, through August 20, there were smaller loadings than in the week of December 10. A further test will soon be furnished as we pass through the next seasonal low. The two weeks containing Christmas day and New Year's day mark the extreme low in ordinary times, while the week after tends to run a little above the week before that particular fortnight, and small gains thereafter are the rule. There will then be a further test and it promises to prove favorable. The steel trade is watching car loadings with particular interest as they are expected to give railroad executives a cue as to buying policies.

Continental Steel Prices Lower as Export Demand Declines

Overseas Inquiry for British Steel Improving—English Pig Iron Activity Is Maintained

LONDON, England, Dec. 19 (*By Cable*)—Pig iron activity is fairly well maintained. Domestic consumers are covering their requirements up to next March. Export demand for British steel is improving.

Continental prices, on the gold basis, for steel products have declined because of smaller export demand. French works in particular are in need of export orders owing to lack of domestic business. British steel users are watching Continental prices closely, though little, if any, business is being done.

French, German, Belgian and Luxemburg hoop makers will meet in Paris Thursday, and there is believed to be a good prospect for reestablishment of the international cartel.

Belgian railways will buy 18,000 tons of rails from Belgian mills and 7000 tons from Luxemburg.

The Continental Wire Rod Cartel has fixed its first quarter quota at 300,000 tons. The next meeting will be held in Brussels early in March.

France is expected to develop Russian business following the ratification of the Franco Soviet Non-Aggression Pact.

Welsh tin plate business is quiet but production is being maintained at 55 to 60 per cent of capacity. The year's exports are expected to exceed those of 1931 by about 20 per cent.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese export	£9
Billets, open-hearth	£4 17s. 6d. to £5 7s. 6d.
Black sheets, Japanese specifications	£10 15s.
Tin plate, per base box	15s. 9d. to 16s. 6d.
Steel bars, open-hearth	£7 17½s. to £8 7½s.
Beams, open-hearth	£7 7½s. to £7 17½s.
Channels, open-hearth	£7 12½s. to £8 2½s.
Angles, open-hearth	£7 7½s. to £7 17½s.
Black sheets, No. 24 gage	£8 5s.
Galvanized sheets, No. 24 gage	£ 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2 1s.
Wire rods, No. 5 B.W.G.	£4 10s.
Black sheets, No. 31 gage, Japanese	£11 5s.
Steel bars, merchant	£2 12s. 6d.
Beams, Thomas	£2 4s. 6d.
Angles, Thomas, 4-in. and larger	£2 11s.
Angles, small	£2 13s.
Hoops and strip steel over 6-in. base	£3 10s.
Wire plain, No. 8	£5 7s. 6d.
Wire nails	£5 10s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Sheet Sales Declined Sharply in November

The volume of business in steel sheets, which showed a good gain in September and October, declined sharply in November, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, composed of independent makers. Sales for the month were 66,274 net tons compared with 94,656 tons in October. Production was 90,679 tons last month against 108,111 tons in October, and shipments declined to 76,866 tons from 92,424 tons during the previous month. Unfilled orders on Dec. 1 were 77,339 tons against 90,707 tons Nov. 1. The November report and comparison in net tons follow:

	Nov.	Oct.	Sept.
Sales	66,274	94,656	78,925
Production	90,679	108,111	89,817
Shipments	76,866	92,424	75,490
Unfilled orders	77,339	90,707	86,570
Unshipped orders	43,144	45,576	48,827
Unsold stocks	60,177	60,257	58,797
Capacity per month	550,000	550,000	550,000
Percentage reporting	62.2	68.4	68.4
Percentages, Based on Capacity			
Sales	19.4	25.1	21.0
Production	26.6	28.7	23.9
Shipments	22.5	24.5	20.1
Unfilled orders	22.7	24.1	23.0
Unshipped orders	12.6	12.1	13.0
Unsold stocks	17.6	16.0	15.6

St. Paul Public Market Will Take Steel

WASHINGTON, Dec. 20.—Unstated requirements of structural steel, reinforcing bars, sheet metal and steel sash and doors will be purchased for a public market to be built in St. Paul by the Friedman Brothers Holding Co., for which a loan of $450,000 has been approved by the Reconstruction Finance Corporation. The market will include a garage having floor space of 42,700 sq. ft.

Pittsburgh Bar Iron Plant To Be Scrapped

The plant of the Pittsburgh Forge & Iron Co., North Side, Pittsburgh, has been purchased by the United Iron & Metal Co., Pittsburgh, and will be dismantled. Equipment will be either sold as used machinery or broken up for scrap. The works was built in 1864, and the present company was incorporated in 1867. It had an annual capacity of 25,000 tons of muck and scrap bar, and 25,000 tons of finished rolled products, including merchant bars, skelp, flue and pipe iron, spike and bolt rods, engine bolts and staybolt iron, screw spikes, heavy marine and machine forgings, car and locomotive axles, crank pins, piston rods and shafts.

Electric Hoist Manufacturers Association reports that the number of hoists ordered during November increased 12.3 per cent as compared with the previous month.

SUMMARY OF THE WEEK'S BUSINESS

Steel Output Declines Further; Sharper Drop Expected Next Week

Ingot Production at 14 Per Cent—Some Steel Producing Units and Many Consuming Plants Will Shut Down During Holiday Period

EXCEPT for such support as is being given by rollings of automobile material and tin plate, steel production this week is more markedly under the influence of year-end cessation of activity in many metal consuming industries. Raw steel output is at about 14 per cent of the country's capacity, a decline of one point from last week, and a further drop is indicated for the holiday period, when a considerable number of steel mill units, as well as a host of manufacturing plants that use iron and steel, will be idle for a week or 10 days, in some instances perhaps longer.

The receipt of orders during the next few days for January shipment might alter the plans of some steel companies with respect to next week's schedules, but the business now on the books does not warrant the expectation that a severe year-end slump in operations can be avoided. The Pittsburgh district will drop to about 10 per cent next week, while Chicago production has already slipped below that figure. There have also been declines in the Valleys and at Birmingham.

In contrast to this slowing down in most districts, the Detroit unit of the National Steel Corpn. is making steel for a brief time at full capacity to meet urgent requirements of automobile manufacturers, and at Cleveland steel operations have declined only slightly owing to the support of automobile companies' needs. Foundries making castings for motor cars are taking more pig iron from Cleveland and Chicago furnaces, with the result that shipments in those districts this month will decline little, if any, from those of November.

TIN plate production, though it has declined to an average of 35 per cent, is the mainstay of some district operations, notably at Wheeling, where a 30 per cent steel-making rate is maintained this week. However, as is customary at this time of year, tin plate has been made in anticipation of January requirements. Some pipe and wire products have also been produced for stock to give Christmas pay to employees. Tin plate contracting for 1933 is proceeding slowly, a situation attributed largely to the fact that producers are taking a firmer price stand than they did a year ago, concessions to large buyers being in lesser amount and not subject to negotiation.

The firm price situation on tin plate is not to be found, however, throughout the whole list of steel products. Marked irregularity has occurred on plates in the East, where sharp concessions from published quotations have been given on attractive tonnages, and some of the larger producers which hitherto have declined to grant such deep cuts have been forced by competition to do so. At Chicago and elsewhere in the Middle West, structural steel prices have weakened on some building projects.

Price adjustments downward for 1933 contracts have been made on ferrosilicon, ferrochromium, ferrovanadium and silico-manganese. Pig iron and scrap prices remain fairly steady in the face of a generally small demand.

IN appraising prospects for the early part of next year, the steel industry looks for its principal support from the automobile industry, though it is not banking too heavily on the volume of car buying that may develop when new models, now being produced for dealers' stocks, are on display floors. Detroit is today the busiest industrial center of the country. Automobile manufacturing schedules have been increased in recent days to the point that a December output of at least 110,000 cars is assured, and, with Ford getting into production, a January total in excess of this figure is virtually certain, as most of the other car makers will maintain present schedules well through next month.

Ford has bought steel for 40,000 bodies of its new line, and further purchases are expected before the end of the month. Chevrolet has also bought additional steel, and the Chrysler Corpn. may place first quarter contracts for materials this week. There have been some fairly large machine tool purchases at Detroit, with more in prospect.

The steel industry is not counting strongly on volume buying by the railroads, although some rail orders are expected within the next two months. A few roads are taking bids on their usual quarterly requirements of various steel products, aggregating several thousand tons. The Santa Fe rail orders, amounting to 27,349 tons, have been distributed among four makers, the bulk going to the Colorado mill.

A moderate amount of general replenishment buying is naturally expected in January, as most consumers and jobbers have let their stocks run down almost to the vanishing point, and there is a hope that this will bring January production at least up to the November average of 18 per cent. Beyond that point the steel companies are unable to gage the extent of the demand for steel in early 1933, the general opinion in the trade being that no vigorous upturn can be expected until some progress has been made toward solving international and domestic economic problems.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	Dec. 20, 1932	Dec. 13, 1932	Nov. 22, 1932	Dec. 22 1931
Per Gross Ton:				
No. 2 fdy, Philadelphia	$13.34	$13.34	$13.59	$15.51
No. 2, Valley furnace	14.50	14.50	14.50	15.50
No. 2 Southern, Cin'ti	13.82	13.82	13.82	14.69
No. 2, Birmingham	11.00	11.00	11.00	12.00
No. 2 foundry, Chicago*	15.50	15.50	15.50	16.50
Basic, del'd eastern Pa.	13.50	13.50	13.50	16.25
Basic, Valley furnace	13.50	13.50	13.50	15.00
Valley Bessemer, del'd P'gh	16.89	16.89	16.89	17.76
Malleable, Chicago*	15.50	15.50	15.50	16.50
Malleable, Valley	14.50	14.50	14.50	16.00
L. S. charcoal, Chicago	23.17	23.17	23.17	23.04
Ferromanganese, seab'd carlots	68.00	68.00	68.00	75.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.				
Per gross ton:				
Rails, heavy, at mill	$40.00	$40.00	$40.00	$43.00
Light rails at mill	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	29.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	29.00
Slabs, Pittsburgh	26.00	26.00	26.00	29.00
Forging billets, Pittsburgh	31.00	31.00	31.00	35.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh lb.	1.60	1.60	1.60	1.50

Finished Steel				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.60
Bars, Chicago	1.70	1.70	1.70	1.60
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.95	1.95	1.95	1.93
Tank plates, Pittsburgh	1.60	1.60	1.60	1.50
Tank plates, Chicago	1.70	1.70	1.70	1.60
Tank plates, New York	1.898	1.898	1.898	1.78
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.50
Structural shapes, Chicago	1.70	1.70	1.70	1.60
Structural shapes, New York	1.86775	1.86775	1.86775	1.75¼
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.00
Hot-rolled strips, Pittsburgh	1.45	1.45	1.45	1.50
Cold-rolled strips, Pittsburgh	2.00	2.00	2.00	2.00

Finished Steel	Dec. 20 1932	Dec. 13 1932	Nov. 22 1932	Dec. 22 1931
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.20	2.20	2.20	2.40
Sheets, galv., No. 24, P'gh	2.85	2.85	2.85	2.80
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.95	2.90
Hot-rolled sheets, No. 10, P'gh	1.55	1.55	1.55	1.60
Hot-rolled sheets, No. 10, Chicago dist. mill	1.65	1.65	1.65	1.70
Wire nails, Pittsburgh	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.25
Barbed wire, galv., Pittsburgh	2.60	2.60	2.60	2.55
Barbed wire, galv. Chicago dist. mill	2.65	2.65	2.65	2.66
Tin plate, 100 lb. box, P'gh	$4.25	$4.25	$4.75	$4.75

Old Material				
Per Gross Ton:				
Heavy melting steel, P'gh	$8.75	$8.75	$9.00	$10.25
Heavy melting steel, Phila	6.75	6.75	7.25	7.75
Heavy melting steel, Ch'go	5.25	5.25	5.87½	7.75
Carwheels, Chicago	7.00	7.00	7.00	8.50
Carwheels, Philadelphia	8.50	8.50	9.25	11.50
No. 1 cast, Pittsburgh	9.50	9.50	9.50	10.00
No. 1 cast, Philadelphia	8.00	8.00	9.25	10.00
No. 1 cast, Ch'go (net ton)	6.25	6.25	6.25	8.50
No. 1 RR. wrot., Phila.	7.50	7.50	7.50	9.50
No. 1 RR. wrot., Ch'go (net)	4.00	4.00	4.50	6.50

Coke, Connellsville				
Per Net Ton at Oven:				
Furnace coke, prompt	$1.75	$1.75	$1.75	$2.25
Foundry coke, prompt	2.75	2.75	2.75	3.50

Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	5.00	5.00	5.37½	7.37½
Electrolytic copper, refinery	4.75	4.75	5.12½	7.00
Tin (Straits), New York	22.90	22.55	23.25	21.87½
Zinc, East St. Louis	3.12½	3.12½	3.15	3.15
Zinc, New York	3.49½	3.49½	3.52	3.50
Lead, St. Louis	2.87½	2.87½	2.90	3.55
Lead, New York	3.00	3.00	3.00	3.75
Antimony (Asiatic), N. Y.	5.40	5.40	5.75	6.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Dec. 20, 1932	1.948c. a Lb.	$13.56 a Gross Ton	$6.92 a Gross Ton
One week ago	1.948c.	13.56	6.92
One month ago	1.948c.	13.59	7.37
One year ago	1.970c.	14.79	8.58
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1932	1.977c., Oct. 4;	1.926c., Feb. 2	$14.81, Jan. 5;	$13.56, Dec. 6	$8.50, Jan. 12;	$6.42, July 5
1931	2.037c., Jan. 13;	1.945c., Dec. 29	15.90, Jan. 6;	14.79, Dec. 15	11.33, Jan. 6;	8.50, Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9	18.21, Jan. 7;	15.90, Dec. 16	15.00, Feb. 18;	11.25, Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3
1928	2.286c., Dec. 11;	2.217c., July 17	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2
1927	2.402c., Jan. 4;	2.212c., Nov. 1	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22

Pittsburgh Steel Orders Affected by Year-End Business Inactivity

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Ingot output in Pittsburgh district declines one point to 14 per cent and is at 13 per cent in the Valleys and 30 per cent at Wheeling.

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Many foundries have shut down until some time in January.

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Scrap market weak, but prices of steel-making grades are not quotably lower.

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PITTSBURGH, Dec. 20.—The usual year-end inactivity in the steel industry is evident in Pittsburgh and nearby districts, but production has not declined as sharply as might be expected. Specifications for finished steel products have been very light in the last week, but have not dropped far enough under the rate which has prevailed for the last month to make the change very noticeable.

On some products, such as sheets, strip steel, tin plate and pipe, new business has fallen off rather sharply, but scattered orders from the automobile industry are still coming in and structural steel awards have not entirely ceased. Structural inquiry, in fact, is holding up very well, although not much tonnage is expected to be placed until January.

Recent rail releases have not benefited the Pittsburgh district. The local mill has completed a run of five or six days. First quarter inquiry from the railroads involves the usual tonnages, but there is no expectation that all the material asked for will be taken out. The Norfolk & Western is inquiring for 2500 tons of bars, plates and shapes, the Chesapeake & Ohio for 1500 tons of plates.

General consumers of steel show little interest in their forward requirements. Tin plate contracting is proceeding slowly, and current specifications are extremely light for this period of the year. Ordinarily, heavier tonnages for January delivery might be expected to reach mills.

Steel ingot production in the Pittsburgh district has declined only slightly to about 14 per cent of capacity. Operations at a number of plants will be suspended Friday or Saturday for the remainder of the year, but even some of the smaller units plan to produce steel next week at the recent rate. Under the circumstances, year-end operations in this district may decline to about 10 per cent.

Valley steel output is estimated at 13 per cent this week, but the operations of independent plants in that territory are considerably lower. Wheeling district production continues at about 30 per cent, with both Bessemer and open-hearth plants maintaining their recent comparatively high output.

Finishing mill schedules are intermittent, but have been benefited to some extent recently by the production of materials for stock. Tin mills in particular have followed their usual custom in this case, but have now reduced production sharply to around 35 per cent of capacity. Pipe mills have also stocked a little material recently.

Finished steel prices show no quotable change, and shading is confined to only a few products in which large tonnages are involved. Reinforcing bars especially are subject to occasional concessions. The attempted advance of $2 a ton on light hot-rolled annealed sheets has not been subject to test.

Pig Iron

Shipments continue very light, and new orders are almost entirely lacking. Foundry activity in the district is at a standstill. One large plant has suspended production until March 1. Most of the others expect to resume operations some time in January. No change in prices is reported, but current levels are tested only by carload buying.

Semi-Finished Steel

No first quarter contracting is reported, as consumers seem to be covered for at least a part of this period. The price of billets, slabs and sheet bars is unchanged at $26, Pittsburgh or Youngstown. Forging billets are quoted at $31, and a little forward coverage is reported. Wire rods are very quiet.

Rails and Track Accessories

Releases from the Chesapeake & Ohio and the New York, New Haven & Hartford enabled the local rail mill to operate for several days, but production has now been suspended. No new buying by the carriers is reported in this district, although Chicago mills shared in the recent purchase of the Santa Fe and in releases from the New York Central and Illinois Central. No accessories have been specified on this tonnage. The New York Central is in the market for car and tender truck axles, while the Atlantic Coast Line will take bids on Dec. 20 for 5000 kegs of spikes.

Bolts, Nuts and Rivets

Specifications are very light. Little first quarter contracting has been completed. Recent changes in bolt selling methods have not involved alteration of the discounts, except on stove bolts in packages, which are now quoted at 75, 25 and 10 per cent off list. The base discount on bolts and nuts remains at 75 per cent off list, while large rivets are quotable at $2.25 a 100 lb.

Bars, Plates nad Shapes

Local fabricators have booked a fair tonnage of structural steel during the month, although the total was helped materially by two or three large Government projects. Some new inquiry is appearing, but closing of most contracts will be delayed until after the first of the year. The reinforcing bar market is also quiet, and prospects for all the heavy hot-rolled products indicate little activity this month. Railroad purchases are lacking, but some first quarter inquiry has appeared. The Norfolk & Western will take bids on Dec. 21 on 2500 tons of bars, plates, and shapes in line with its usual quarterly practice. The Chesapeake & Ohio is also inquiring for 1500 tons of car parts, composed principally of plates. The quarterly list of the New York Central, on which bids will be taken on Dec. 27, also calls for a tonnage of bars, plates and shapes. This road has released a fair tonnage of plates for car repairs to Pittsburgh district mills in the last week. Demand for bars is generally light. Prices are holding at 1.60c., Pittsburgh, on the three heavy hot-rolled products, with weakness confined principally to reinforcing bars. Sizable tonnages of this product usually develop concessions, although many of these may be traced to the low delivered figures quoted by distributers.

Tubular Goods

Orders are lighter than they were early in the month, and shipments have declined. Some mills have made a little material for stock in the last week, and most of them now have little tonnage to produce before January. Oil country goods are in better demand than other products, with buttweld pipe particularly quiet. The New York Central is inquiring for a small tonnage of seamless tubing in

connection with its usual first quarter purchases.

Wire Products

Manufacturers' wire is less active than it was a month ago, as automobile requirements are lighter. Merchant products are meeting scarcely any demand, as jobbers are taking inventories and will not replenish stocks until January. A small quantity of wire products is included in the first quarter requirements of the New York Central Railroad. Little first quarter contracting has been reported, but prices are steady on such business as is being closed.

Sheets

Demand for sheets with most producers has declined to the low levels of last summer. Production this week is not above 12 per cent of capacity. Some mills will resume output in a limited way next week, but others will be inactive until after New Year's. All consuming lines are dull, and specifications from the automobile industry are confined to experimental orders and small tonnages supplementary to original purchases for production of new models. Demand from jobbers is almost entirely lacking, but a little railroad business is promised by the first quarter inquiry of the New York Central, which calls for hot and cold-rolled sheets as well as furniture and galvanized material. Prices are untested by forward buying and quotably unchanged.

Tin Plate

Completion of December schedules by at least two large plants has brought about a decline in production this week, and the industry as a whole is averaging little better than 35 per cent of capacity. Specifications for January shipment have been rather disappointing, as some of the tonnage which would normally come out at this time had been ordered previously. Contracting for 1933 is slow, but some mills have covered a fair number of their customers.

Strip Steel

Demand for hot and cold-rolled strip steel is comparable with that for sheets, and has not been at a lower level in the current year. Automotive releases are small and widely scattered, and strip mill schedules this week average from 10 to 12 per cent of capacity. Prices are subject to little pressure and are considered rather firm in the trade.

Coke and Coal

Domestic coke has been in heavy demand in the last week, and by-product plants in the district have been able to move sizable stocks. The other grades of coke are just as dull as they have been, but foundry consumption may be expected to increase next month. Domestic coal is active, but industrial and railroad grades continue very quiet.

Scrap

While consumers' purchases of the steel-making grades are still lacking, the market has not developed the weakness which was apparent last summer. Scarcely any distress tonnage is coming out, and, although one mill has picked up a few orders of heavy melting steel at $8.50, this price could hardly be duplicated on a tonnage. Under the circumstances, the market remains unchanged from last week on practically all grades. Dealers are paying $6.25 or better to cover old orders for machine shop turnings, and little of this grade is available at less. Specialties are particularly quiet in view of the low operations in foundries in the vicinity.

Pittsburgh-Valley Mills Want Lower Rates to Detroit-Toledo

Petition Railroads for Reductions on Shipments to Automobile Territory to Meet Water Competition

DECLARING that they must have lower rail rates on steel shipped from the Pittsburgh and Valley districts to the Detroit-Toledo district to compete with Lake front mills having low water rates, producers in the Pittsburgh and Valley districts have appealed to the Central Freight Association for a sharp reduction in rail rates to the Detroit-Toledo district. A public hearing on the application has been set for Dec. 22 at Pittsburgh.

The position of the steel producers is outlined in a letter sent by John A. Coakley, Pittsburgh general traffic manager for subsidiaries of the United States Steel Corpn., to Eugene Morris, chairman, Central Freight Association, Chicago. This letter states that the average amount of steel used in an automobile is 2100 lb. and the automobile output should exceed 3,000,000 cars a year. Steel plants in the Detroit territory have a capacity of approximately 1,000,000 tons a year so that outside producers can reasonably be expected to supply at least 2,000,000 tons a year. At present a large portion of this is shipped by water from Chicago, Buffalo and Cleveland and on these shipments the freight rate is from $3 to $4 a ton.

Low water rates, the letter states, have enabled the Buffalo, Cleveland and Chicago mills to capture the market in the Detroit-Toledo territory. Mills in the Pittsburgh and Valley districts have made efforts to retain their place in these markets through absorption in prices, but the steadily declining price base has now reached a point where the producers can go no further.

The Pittsburgh-Valley district mills affected ask that all rail rates be established to enable them to meet the Lake front competition in the Detroit-Toledo territory, such rates to be restricted to destination points which can actually be reached by water. As an alternative, the establishment of proportional rates to lower Lake Erie ports limited in their application to business destined for the Detroit-Toledo territory was suggested. These rates would have to be sufficiently low so that when combined with water rates from lower Lake Erie ports to destination the rates would enable the inland steel plants to compete with the Lake front producers. The contention is made that the proposed rates would not only be remunerative but would meet competitive vessel and truck rates and would not tend to break down the present rate structure. The proposed rates are given below:

	To Detroit: Present Rate per 100 Lb. Excluding Surcharge	Proposed Rate
From Pittsburgh ..	26½c.	20c.
From Youngstown.	23c.	15c.
	To Toledo	
From Pittsburgh ..	23½c.	20c.
From Youngstown.	20½c.	15c.

Proportional rates proposed in lieu of above:

	To Cleveland: Present Rate per 100 Lb. Excluding Surcharge	Proposed Rate
From Pittsburgh ..	18½c.	13c.
From Youngstown.	12c.	8c.

Detroit Scrap Market Quiet; Prices Unchanged

DETROIT, Dec. 20—There has been little scrap buying the past week, but dealers are hopeful of a pick-up in January. Prices are unchanged and are believed to have touched bottom. The local steel mill is taking in fair tonnages on contract. The year's final water shipment of scrap arrived from Milwaukee yesterday to be delivered to the Chrysler foundry.

The New Jersey Foundrymen's Association held a dinner meeting at Newark, N. J., on Dec. 15, which was attended by 50 members. A discussion, illustrated with motion pictures, covering the Brackelsberg furnace and production of alloy castings, was presented by Don Reese, metallurgist, Whiting Corpn., Harvey, Ill.

Chicago Ingot Output Below 10 Per Cent of Capacity

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CHICAGO, Dec. 20.—Ingot output has dropped below 10 per cent of capacity, notwithstanding rail releases that have taken up some of the slack in demand from miscellaneous industries. Both rail mills are operating at low schedules on releases against old commitments. The Santa Fe's orders for 27,349 tons of rails have helped materially, along with new commitments by some automobile manufacturers, to hold new business at the level of recent weeks. Forward contracting remains dull.

The Chicago steel industry expects the automobile industry and manufacturers of farm equipment to be larger users of steel in January than they have been in December. The course of steel production over the next week and a half is problematical. Order mails are light, and the disposition now is for most mill units to go down for Christmas day and not resume output until the first week in January. An increase in releases for early January delivery, now evident only in small quantity, would alter these plans.

The scrap market remains listless, and dealers are putting unprepared scrap on local docks, where it will be sorted and made available for boat shipment in the spring.

Pig Iron

Releases on Northern foundry iron are turning upward because of the needs of several major consumers. This reversal of trend promises to bring December shipments closely in line with those of November. Although not many January shipments are scheduled, sellers feel reasonably certain, based on the attitude of users, that the January melt will show improvement. New buying remains spotty and covers both nearby and future requirements. Two thousand tons of silvery has arrived at a Chicago dock.

Ferroalloys

Dealers have contract prices for 1933 delivery, and they are busily engaged canvassing the trade. Quotations for electric ferrosilicon, ferrochromium and silicomanganese are all lower than quoted in 1932.

Bolts, Nuts and Rivets

Forward contracting is now about 50 per cent completed. Spot orders in this district are few, but consumption in automobile manufacturing centers is improved.

Rails and Track Supplies

The Santa Fe's orders for a total of 27,349 tons of rails is the outstanding news in this market. Of this tonnage, 22,605 tons went to the Colorado mill, 1908 tons was awarded to Bethlehem, and Inland and Illinois Steel each participated to the extent of 1418 tons. The Inland mill, which is a combination structural and rail mill is again, after about five months, rolling rails. Releases are small and are against old commitments. The Steel Corporation's mill continues on a light schedule. Cold weather and increasing consumption for coal are resulting in a moderately larger demand for light rails. Track accessory shipments are light, as is to be expected at this time of year.

Santa Fe Railroad distributes orders for 27,349 Tons of rails, Colorado mill benefiting most.

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Ingot output in Chicago district has dipped below 10 per cent, with next week's schedules uncertain.

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Pig iron releases from a few major consumers are turning upward.

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Reinforcing Bars

The Dec. 23 letting at Springfield, Ill., is holding the attention of the trade. A move is under way to bring pressure against the practice of diverting gas tax receipts to unemployment aid. Contractors and supply people want this money spent for road work. Shipments of reinforcing bars are very light, and mills are all but idle.

Structural Material

With the exception of a small tonnage ordered by an oil refiner, all transactions of 100 tons or more in this market are confined to highway bridge work. Only one building permit, and that was of small size, was issued in Chicago last week. Pending work consists of bridges in Indiana, Illinois and Iowa. Fresh inquiries, except for extremely small lots, are lacking.

Plates

Output by local plate mills is at the lowest point of the year and there is a dearth of pending work. Orders are confined to small lots.

Sheets

Small quantities of sheets moving from Chicago to automobile builders form the bulk of shipments from hot mills. Monday's mail was very light, and hot mills will not start to produce until Wednesday. Specifications from jobbers are curtailed sharply as the year's end approaches. The roofing trade reports business very dull.

Cast Iron Pipe

Fort Wayne, Ind., is readvertising for 150 tons, and Springfield, Ill., is still in the market for a like tonnage for a water plant. The various factions at Wilmette, Ill., seem to be near an agreement, and there is now reason to believe that the water plant project will soon have a clear track. Most projects that are going ahead with the aid of Government funds are to the west and south of Chicago.

Wire Products

Demand from consumers continues to shrink, though output remains in the range from 20 to 25 per cent of capacity as producers use this period to round stocks in their own warehouses. Shipments this year are roughly about 65 per cent as heavy as in 1931. Practically the entire support to this market is coming from automobile manufacturers. Public utilities are giving closer attention to copper quotations, thereby indicating that strengthening in prices for that metal would lead them into the market.

Bars

Automobile manufacturers and forgers have taken a long lead among consumers of bars. The farm implement group has made little headway and probably will gain no momentum until some time in January. Sellers expect that the automobile industry will take more bars in January than at present. Rail bar mills have received a few releases for shipment after Jan. 1. The current movement is very light and mills are all but idle.

Scrap

A few odd lots of heavy melting steel have been taken by mills at $5.50. In general, consumers are staying out of the market, and as a result some unprepared scrap is moving to local docks, where it will be prepared either for local distribution or for movement by boat in the spring. The consensus of opinion is that water shipments will be made with the opening of navigation. The Burlington is offering 2000 tons of scrap. In most instances the railroads load scrap soon after it is sold.

Eastern Pennsylvania Trade Shows Further Narrowing

Market Listless on Eve of Holiday Period—Some Capacity Will be Shut Down Next Week

PHILADELPHIA, Dec. 20—With the market listless and narrowing further as 1932 draws to an end, the iron and steel trade in the eastern Pennsylvania district is looking to a possible upswing after the new year. It is thought business may reach the November level at that time. Any pick-up, however, is expected to be moderate. Replenishing of inventories is likely to bring a somewhat better demand for steel in January.

There is hope also that the automotive industry may come into the market more briskly. This source of purchasing is likewise uncertain because of the slow sales of cars, but it is believed that the market for new low-priced models may be stimulated. Large-scale buying by the railroads and the construction industry appears improbable in the near future. The upshot is that no great improvement for iron and steel demand is likely before spring.

Steel works and mills will show a further letdown with the arrival of the Christmas holidays. Some plants will close mills or bank open-hearth furnaces only on Christmas and New Year's, while others will be down in both departments for a week or 10 days. Operations of steel works remain at about 13 per cent of production capacity.

Pig Iron

Demand still is confined to car lots and is even quieter than it was a week ago. Prices are unchanged. A shipment of about 500 tons of Manchurian iron is expected to reach this port at the end of the present or the forepart of next week. Of this quantity, 100 tons has been sold to a pipemaker on the Delaware River. The remaining tonnage is being offered for sale. It is said it is being quoted at $11.85, on cars at Philadelphia, which includes the duty. However, it is reported the price can be depressed to $11.50, or $1 a ton under the price of No. 2 foundry at eastern Pennsylvania furnace. The Japanese iron analysis is quite similar to that of domestic No. 2 foundry iron.

Sheets

Philadelphia body builders are taking light tonnages. Larger requirements are expected to be placed after New Year's by one builder which will begin to turn out bodies in fair-sized lots about the middle of January. Prices of common grades of sheets are said to be steadier than those for automotive sheets.

Plates Shapes and Bars

Mills report that demand is extremely quiet. Railroads have halted even the moderate program of buying limited quantities for new equipment and repair to old rolling stock. The result is that the market has been given no recent test, but is understood to have become more irregular following the placing of some plate tonnages at prices well below the published quotation of 1.60c., Pittsburgh. The South Chester Tube Co. is reported to have been awarded part of the pipe tonnage for the Philadelphia Post Office, requiring about 600 tons in all.

Warehouse

Jobbers report that some consumers have indicated they will come into the market for small lots after the first of the New Year. Prices are unchanged.

Imports

The following iron and steel imports were received here last week: 6033 tons of pig iron from the Netherlands, 500 tons of chrome ore from British India, 25 tons of tungsten ore from China and 5 tons of round steel bars from France.

Scrap

Virtually no shipments are moving to mills, and the market remains sluggish, with no change in prices.

San Francisco-Oakland Bridge To Go Ahead

SAN FRANCISCO, Dec. 19.—Governor Rolph having signed the contract covering the legal details of the purchase of $62,000,000 of bonds by the Reconstruction Finance Corporation, the outlook is favorable for bids being taken on the San Francisco-Oakland bridge early in February. The contract will become effective as soon as the legislature has approved measures which will place the bridge in the State highway system for maintenance purposes.

It is reported that the Spokane Gas & Fuel Co. is contemplating the construction of 300 miles of gas pipe line from the Cut Bank District in Montana to Spokane at a cost of approximately $12,500,000. The line would serve other Inland Empire cities as well as Spokane.

The Acme Brewing Co., San Francisco, is having an advertising sign erected in the south part of the city that will require 36 tons of angles.

The Pacific Coast Steel Corpn. has been awarded the contract for furnishing 40 tons of rails and accessories for the ammunition depot at Mare Island, Cal.

Plans are being prepared for the first unit of the Southern California State Mental Hospital to be erected near Camarillo in Ventura County. The first unit will be a two story reinforced concrete ward building costing approximately $375,000. Bids will be taken about March 1.

Bids will be taken up to Dec. 23 for furnishing San Francisco with 200 fire hydrants.

The date has been advanced from Dec. 21 to Jan. 4 for furnishing Mare lsland, Cal., with four 1000-hp. boilers, weighing 200 tons, with settings, superheaters, oil burners, automatic control equipment with master control, soot blowers, boiler appurtenances, valves and piping.

Alabama Production in Year-End Curtailment

BIRMINGHAM, Dec. 20.—This month is particularly bleak for pig iron. Bookings and shipments for December to date have been almost negligible. Moreover, there is very little business ahead for the remainder of the month. The Woodward Iron Co. banked its two furnaces on Dec. 15, and will be out of production until some time in January. The Tennessee company is expected to bank its single active furnace either Tuesday or Wednesday for the holidays. It is likely that Republic Steel Corpn. will also bank its furnace within a week. Sloss-Sheffield Steel & Iron Co., with one furnace in production, has not announced any contemplated change. The banking of the two Woodward furaces leaves three active stacks in this district, two of which are on foundry and one on basic. It is probable that around Christmas time there will be only one active stack for a few days. The pipe situation is still unsatisfactory, current tonnage being small. Pig iron quotations are being held at $11 for the Southern market.

Steel

Current bookings remain on a routine basis, with orders mostly of small size. New tonnage of one company has gained slightly for two successive weeks, but this improvement has not altered the local situation. Mills are on short schedules and the output is restricted. Last week five open-hearths were active. For this week, after Tuesday, there will likely be only two units.

Scrap

Scrap is marking time, with few sales and few shipments. Foundry requirements are unusually low at this time.

Cleveland Production Steadied By Automobile Steel Orders

Ingot Rate Has Slipped to 26 Per Cent, But Month's Business Will Almost Equal That of November

CLEVELAND, Dec. 20. — Business in finished steel is being sustained by a continuance of the demand from the automotive industry. While no large lots from that source were placed with mills in this territory during the week, there was enough business in small orders, mostly in hot strip, bars and sheets, to maintain the volume of the previous week. December business, according to present indications, will not show much falling off as compared with November.

Ingot output in Cleveland declined three points this week to 26 per cent of capacity, one open-hearth furnace having been shut down. While steel plant operations during the next two weeks are uncertain, producers are not planning complete shutdowns during the holiday week, as the demand from the automotive industry is expected to hold up, and producers wish to be in position to make the prompt deliveries that are usually demanded by the motor car manufacturers. Some of these consumers are now covered for most of the steel they will require for January schedules.

The Wheeling & Lake Erie Railroad has released 50 70-ton gondola cars to the Canton Car Co. This railroad purchased 100 cars earlier in the year, but released only 50 at the time. Other railroad business in this territory is confined to miscellaneous requirements. Railroads centering here are not expected to come into the market for their 1933 rail requirements for several weeks.

Steel commitments for the first quarter have been confined almost wholly to extension of fourth quarter contracts. With curtailed plant operations, many manufacturing consumers will carry over nearly enough contract coverage from the present quarter to last them through the coming quarter, and to assure protection they have had these contracts extended at the unchanged prices.

Pig Iron

Demand from the motor car industry shows further gain, and December shipments will be heavier than expected earlier in the month. As a result of releases from automobile foundries, a leading producer will ship more iron this month than in November. Sales continue light, amounting to about 1500 tons during the week. A Dayton, Ohio, melter is in the market for 1000 tons of foundry iron for the first quarter. However, foundries generally are taking no interest in first-quarter contracts. Prices are steady.

Iron Ore

Lake Superior ore consumed in November amounted to 696,331 tons, a decrease of 38,679 tons from that of October, and little more than 1,311,212 tons consumed in November last year. Furnace stocks Dec. 1 amounted to 26,892,609 tons. Stocks at furnaces and Lake Erie docks on that date were 32,083,723 tons, a decrease of more than 7,000,000 tons compared with the same date a year ago, when the stocks amounted to 39,232,150 tons. Central district furnaces in November used 396,657 tons, a decrease of 29,797 tons, and Lake front furnaces consumed 295,733 tons, a decrease of 10,638 tons. Eastern furnaces used 3770 tons, a gain of 1678 tons and all-rail furnaces used 171 tons, an increase of 78 tons. There were 45 furnaces in blast Nov. 30 using Lake ore, an increase of one for the month.

Bars, Plates and Shapes

Several highway bridge jobs requiring fair-sized lots of structural steel are pending in Pennsylvania and New York. Similar work in Ohio has tapered off. With the absence of recent lettings, new orders for structural shapes have declined. Demand for steel cars is holding up fairly well for this time of the year. Plates are very dull. Prices are steady.

Sheets

Demand from the motor car industry has declined. Some of the automobile companies have enough tonnage on order to take care of their requirements through this month and the early part of January, and little new business is expected from that source until around the first of the year. Some of the local stamping plants are fairly busy with automotive work and continue to place small orders. Demand from other industries is very slack. Black sheets are now generally quoted at 2.20c, Pittsburgh, the price that is named for the first quarter. However, some buyers who have not been taking shipments as rapidly as was expected will be allowed to take deliveries at 2.10c through January.

Strip Steel

Some releases for hot-rolled strip have been issued by the automobile industry against recent orders and these are expected to cover requirements until Jan. 15. Orders for small tonnages are coming from local stamping plants doing automotive work. The market is firm at 1.45c, Pittsburgh. Cold-rolled strip is quiet and unchanged at 1.90c to 2c.

Scrap

While there is no new demand at present, some steel plant buying is expected around the end of the year for January shipment. A local mill continues to take a moderate amount of steel-making scrap. There is virtually no demand in the Valley district. Prices are unchanged and nominal.

St. Louis Foundries Get Orders for Breweries

ST. LOUIS, Dec. 20—Jobbing foundries have found a bright spot in the demand for machinery and equipment for breweries, and considerable business has been placed in anticipation of the legalizing of beer. A six-months' survey by the Industrial Club of St. Louis reveals that "even in prohibition, methods and equipment grew obsolete; that refrigeration and invention have changed so materially that brewing will never actually pick up where it left off in 1920." Brewing in St. Louis at its peak was a $25,000,000 industry, the club states. Otherwise, the trade is extremely quiet.

Steel

The steel trade is looking forward to considerable business being placed in January and February for road and bridge projects recently awarded or pending. Meanwhile, few orders are being received. The Illinois Highway Commission will open bids Dec. 23 for 225 miles of concrete roads and 11 highway bridges, a total of 2250 tons of reinforcing bars and 1600 tons of structural steel. The Oklahoma Highway Commission will open bids today for various highway bridges, requiring 1600 tons of structural steel. The Service Construction Co., Joplin, Mo., was awarded the general contract for a highway bridge at Poplar Bluff, Mo., requiring 478 tons of structural steel. The Boardman Co., Oklahoma City, was awarded the contract for a highway bridge in Okfukee County, Okla., requiring 545 tons of structural steel.

Hot-rolled sheets (No. 10) are now placed in two price groups by warehouses, as follows: up to and including 48 in. wide, 3c., and over 48 in. wide, 3.15c. Warehouse prices on hot-rolled annealed sheets (No. 24) and galvanized corrugated sheets, are 10c. per 100 lb. lower and on galvanized corrugated sheets 35c. per 100 lb. lower.

Scrap

A leading consumer in the district, which bought a round tonnage of scrap last week, has indicated that it will make additional purchases on a basis of 25c. a ton below the figures of the recent transaction.

New York Steel Trade Busy on 1933 Tin Plate Contracts

Business Otherwise is Extremely Dull—Deep Concessions on Attractive Plate Tonnages Disturb the Market

NEW YORK, Dec. 20.—Aside from the signing of a few 1933 tin plate contracts, accompanied in some cases by specifications for January shipment, the local steel market has been extremely dull the past week. Many metal-working plants are shutting down this week for inventory, and quite a few are idle because of lack of orders. Under such circumstances, there have been many requests to hold up shipments until after Jan. 1 even on small lots that had been specified.

A weak situation in prices of plates, which has disturbed the market for some time, has become more acute. A recent order for about 1200 tons of plates is reported to have been taken by a leading producer at the equivalent of 1.20c a lb., Pittsburgh, or $8 a ton under the published market quotation. Although there is still an effort to hold to 1.60c, Pittsburgh, or 1.70c, Coatesville, on the ordinary run of business, deep concessions have been granted on most of the attractive tonnage recently placed.

Pig Iron

Activity is still restricted to spot transactions. For the second week total bookings amounted to only 1000 tons. The 1250-ton inquiry of the General Fire Extinguisher Co., Auburn, R. I., is still pending. No other major tonnage is before the trade. Demand for low phosphorus iron during the fourth quarter has been unusually light. Despite the dearth of business for that metal, furnace prices have been well maintained. Foreign low phosphorus iron, which some time ago had been offered at as low as $14 to $14.50, duty paid, port of entry, has in recent months been virtually excluded from Eastern markets because of the insignificant character of special demand. The same situation applies currently in demand for foundry iron. With spot business generally ruling, domestic furnaces are taking a major share because of their ability to make quick shipment of special analyses. Furnace base prices are unchanged.

Reinforcing Bars

Specifications have been issued on a group of buildings for the State hospital at Gowanda, N. Y., which is expected to require a fairly sizable quantity of bars. Highway construction in New York and New Jersey accounts for 375 tons of fresh inquiry. The only important letting during the week covered 200 tons for a State highway bridge at Wellsville, N. Y. Prices are unchanged at 1.75c., Pittsburgh, and 2.10c., delivered New York.

Scrap

Consumer interest is extremely light as mills approach holiday recesses. Bid prices for No. 1 and No. 2 heavy melting steel, which are still being loaded for export, are unchanged at $4 to $4.50 and $3 respectively, on barge. No. 1 and No. 2 cast grades are lower, with brokers paying a flat price for both grades of $4.50, on boats. Specialties are quiet.

New England Stocks of Pig Iron Very Low

BOSTON, Dec. 20.—Business in pig iron is confined largely to truck and trailer loads, with an occasional railroad carload. Sales the past week did not exceed 500 tons. The General Fire Extinguisher Co., Auburn, R. I., has yet to cover on its recent inquiry. Inquiries are few in number, with none exceeding 50 tons. Stocks in New England foundry yards on Dec. 31 will be the smallest for that date in a great many years, and unfilled contracts also involve a small tonnage. A shortage might easily develop should demand in the first quarter pick up.

Scrap consumers are not contracting for fresh supplies, but rather are endeavoring to reduce inventories. As a result, the market is virtually at a standstill. The American Steel & Wire Co., Worcester, Mass., heretofore paying $5.25 to $5.50 a ton, delivered, for No. 1 heavy melting steel, has dropped its price to $5.

Canadian Iron and Steel Business in a Slump

TORONTO, Dec. 19.—General business in the Canadian iron and steel markets is feeling the effect of the Christmas holiday season, and the slump in sales is more pronounced than a month or six weeks ago. The past week brought little in the way of new business into the various markets, and representatives of most producing companies state that there is little hope for any change in conditions this year. There are some factors, however, that might indicate some revival before the end of January, although no large contracts are in the offing.

It was announced during the week that additional men are being taken on for increased operations in the automotive industry, and the Canadian Pacific Railway has reopened its car shops and is employing upward of 8000 hands. Otherwise, the outlook is far from bright. The building trades show no signs of improvement, while allied branches are practically at a standstill.

Buffalo Pig Iron Trade Dull; Scrap Stagnant

BUFFALO, Dec. 20.—Interest in the pig iron market is nominal. No sizable inquiries are being received. There has been some sounding out of the market which may result in business after the first of the year. The General Fire Extinguisher Co. business is expected to go to foreign makers or to eastern Pennsylvania.

Steel

A Buffalo fabricator of structural steel has taken the contract for a 265-ton State bridge at Flemington, Pa., and a 600-ton State bridge at Concord, N. H. Bids will go in this week on a 1200-ton State highway bridge at Owego, N. Y. Bids will also go in this week on the 2000-ton State hospital at Gowanda, N. Y., and the 900-ton Elmira reformatory addition. The Lackawanna plant of Bethlehem Steel is operating three open-hearths and Republic Steel two open-hearths.

Scrap

The market is quiet, with no transactions of any kind reported. It is expected that some sizable purchasing will be done within the next two or three weeks.

Cincinnati Trade Acting on 1000 Tons of Pig Iron

CINCINNATI, Dec. 20.—The customary year-end slackening of buying interest brought pig iron sales to less than 400 tons in this district the past week. Except for an inquiry for 1000 tons of Northern foundry iron from a southern Ohio consumer, there is no apparent interest in first quarter buying. Stocks of district melters are low. Shipments against old contracts are in fair volume. The melt is without appreciable change.

Steel

Sheet steel demand is sluggish. The automotive manufacturers are taking small amounts of steel regularly, but other sheet users show little interest. First quarter business is negligible.

Scrap

The scrap market is colorless. While the whole list of quotations is weak, reductions on melting steel and malleable iron were the only changes in the past week. Some blast furnace scrap is moving on old contracts.

Fabricated Structural Steel

Awards Decline—New Projects Total 10,500 Tons

STRUCTURAL steel awards, at 9925 tons, compare with 35,600 tons last week and 10,067 tons two weeks ago. The outstanding letting was 3050 tons for a viaduct at Newark, N. J., over the Pennsylvania and Lehigh railroad tracks. New projects, totaling 10,500 tons, are made up mainly of public undertakings, with bridges predominating. The largest new inquiries are 2400 tons for a State highway bridge at Rutherford, N. J., and 2400 tons for a hospital building at Baltimore.

NORTH ATLANTIC STATES

Concord, N. H., 600 tons, Merrimack River bridge, to Lackawanna Steel Construction Corpn.

Greenwich, Conn., 115 tons, hospital, to Montgomery Iron & Steel Co.

Binghamton, N. Y., 650 tons, post office, to McClintic-Marshall Corpn.

State of New Jersey, 3050 tons, viaduct, route 21, section 1-A, over Pennsylvania and Lehigh Valley tracks at Newark, to Phoenix Bridge Co.; J. F. Chapman & Son, Hillside, N. J., general contractors.

Stroudsburg, Pa., 110 tons, post office, to American Bridge Co.

Clinton County, Pa., 260 tons, State highway bridge, route 58, to Lackawanna Steel Construction Corpn.

Pittsburgh, 110 tons, concrete-mixing barge for Vang Construction Co., to American Bridge Co.

THE SOUTH

State of Louisiana, 720 tons, highway bridge, to Jones & Laughlin Steel Corpn.

CENTRAL STATES

Chicago, 200 tons, Twenty-third Street bridge, to Duffin Iron Co.

Mount Vernon, Ohio, 200 tons, post office, to Mount Vernon Bridge Co.

Grand Rapids, Mich., 250 tons, State highway bridge to R. C. Mahon Co.

Randolph County, Ill., 275 tons, bridge, to Virginia Bridge Co.

Bureau County, Ill., 125 tons, bridge, to Clinton Bridge Co.

Butler County, Iowa, 240 tons, highway bridges, to Pittsburgh-Des Moines Steel Co.

State of Iowa, 575 tons, bridges; 100 tons to Rock Island Bridge & Iron Co., 475 tons, McClintic-Marshall Corpn.

Rushford, Minn., 175 tons, bridge, to McClintic-Marshall Corpn.

Milwaukee Road, 100 tons, bridge, to Wisconsin Bridge & Iron Co.

Hendrickson, Mo., 475 tons, bridge, to Stupp Brothers Bridge & Iron Co.

Fall River, Kan., 100 tons, State bridge, to Pittsburgh-Des Moines Steel Co.

Kansas City, Kan., 600 tons, steel piling for Kaw River bridge, to Kansas City Structural Steel Co.

White Eagle Refining Co., 125 tons, to Kansas City Structural Steel Co.

State of Nebraska, 340 tons, bridges, to Wisconsin Bridge & Iron Co.

WESTERN STATES

Fremont County, Idaho, 115 tons, structures for Bureau of Public Roads, to Minneapolis-Moline Power Implement Co.

Merced, Cal., 100 tons, post office, to Minneapolis-Moline Power Implement Co., previously reported to Golden Gate Iron Works.

El Centro, Cal., 110 tons, post office, to Virginia Bridge & Iron Co.

Oregon City, Ore., 890 tons, bridge over Clackamas River, to Poole & McGonigle Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Boston, 400 tons, ventilating building, East Boston tunnel.

Rome, N. Y., 135 tons, addition to State school; bids opened Dec. 21.

Binghamton, N. Y., 1250 tons, highway bridge.

New York Central Railroad, 300 tons, bridge at Poughkeepsie.

Rutherford, N. J., 2400 tons, State highway bridge.

State of Pennsylvania, 600 tons, highway bridge in Jersey Shore Township.

Phi'adelphia, 580 tons, viaduct from Schuylkill River to Thirtieth Street; bids to be opened Dec. 30 by Bureau of Engineering and Surveys.

Delaware City, Del., 110 tons, movable highway span for War Department; Triest & Earle, Inc., Philadelphia, low bidder on general contract.

Susquehanna County, Pa., 500 tons, highway bridge.

Baltimore, 2400 tons, hospital building for University of Maryland.

THE SOUTHWEST

State of Oklahoma, 1600 tons, highway bridges; bids opened Dec. 20.

Okfuskee County, Okla., 543 tons, highway bridge; Boardman Co., Oklahoma City, general contractor.

Sawyer, Okla., 750 tons, highway bridge over Kiamichi River.

CENTRAL STATES

Fountain City, Wis., 685 tons, Mississippi River Lock No. 5; Edward E. Gillen Co., Milwaukee, general contractor, at $783,528.16.

Frankfort, Ill., 150 tons, bridge.

State of Illinois, 1600 tons, 11 highway bridges, including Bond County, 457 tons; Fulton County, 415 tons; Randolph County, 478 tons, and Washington County, 160 tons; bids to be opened Dec. 23.

State of Missouri, 478 tons, highway bridge at Poplar Bluff; Service Construction Co., Joplin, Mo., general contractor.

WESTERN STATES

Barstow, Cal., 385 tons, State highway bridge; bids after Jan. 1.

FABRICATED PLATE

AWARDS

Long Island City, N. Y., 240 tons, storage bins for National Sugar Refinery Co., to National Bridge Works.

Fort Mason, Cal., 300 tons, to Bethlehem Steel Export Co.

Long Beach, Cal., 310 tons, four tanks for Monarch Refining Co., to Southwest Welding & Mfg. Co.

Reinforcing Steel

Awards 1100 Tons—New Projects 3400 Tons

State of New York, 200 tons, highway bridge at Wellsville, to Concrete Steel Co.

Lansing, Mich., 225 tons, post office, to Capitol Steel Co.

Omaha, Neb., 200 tons, post office, to Sheffield Steel Co.

Alameda, Cal., 140 tons, eight units at Government Island, to Truscon Steel Co.

Santa Monica, Cal., 166 tons, State highway bridge over Topanga Creek, to Blue Diamond Co.

Ventura County, Cal., 122 tons, State highway paving between Santa Clara River and Ventura, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

Gowanda, N. Y., unstated tonnage, Homeopathic State Hospital buildings; bids taken Dec. 22.

State of New Jersey, 165 tons, highway construction, route S-28, section 3, from route 25 to Commercial Avenue, New Brunswick; bids Dec. 28.

State of New York, 208 tons, highway construction, Narrowsburg to Callicoon.

Fountain City, Wis., 365 tons, Mississippi River Lock No. 5; Edward E. Gillen Co., Milwaukee, general contractor, at $783,528.16.

State of Illinois, 2250 tons, 225 miles of concrete highway paving; bids to be opened Dec. 23.

Monterey County, Cal., 157 tons, State highway paving south of San Ardo; bids to be called Jan. 4.

Pasadena, Cal., 1150 tons, Pine Canyon Dam, bids to be called Dec. 27.

Cast Iron Pipe

Boston closes bids Dec. 22 on 1200 tons of 8 to 16-in. class B, and will close bids Dec. 23 on 150 tons of fittings.

New York City has purchased 1000 tons of 6-, 8- and 12-in. from Donaldson Iron Works, United States Pipe & Foundry Co. and Central Foundry Co.

Schenectady, N. Y., has awarded 730 tons of 24-in. to United States Pipe & Foundry Co.

State of New York is taking bids this week on 200 tons of various sizes for highway projects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for 4350 ft. cast iron soil pipe (Schedule 9277) for Washington Sewell's Point, Va., and Mare Island Navy yards.

Fort Wayne, Ind., is readvertising for 150 tons.

Everett, Wash., will take bids soon on 250 tons of 4- to 8-in.

Pipe Lines

Natural Gas Co., Jackson, Miss., is planning steel pipe line from Jackson gas field to Union, Forest, Philadelphia and neighboring points in State. Will begin work next spring.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for steel conduit pipe (Schedule 9282) for Eastern and Western Navy Yards.

Board of Public Works, Seattle, Wash., will ask bids soon for about eight miles of 20- to 36-in. pipe for water service; alternate proposals on steel, cast iron, concrete and wood pipe.

Ocean Oil Transport & Pipe Line Co., Houston, Tex., is considering 6- and 8-in. steel pipe line from east Texas oil field district to terminal on Houston ship channel. Proposed line will have daily capacity of about 12,000 bbl.

Copper Export Demand Improves; Tin Advances on Higher Sterling

NEW YORK, Dec. 20.—Speculative demand abetted by improved sentiment brought about a moderate revival of trading in the principal foreign copper markets during the week. As a result, Continental prices for electrolytic sought higher levels, advancing from 4.85c. early last week to the prevailing quotation of 5.10c., c.i.f. usual European ports. A fair amount of business at the latter price was reported today by American sellers. A perceptibly stronger undertone in the domestic market has followed the more vigorous activity abroad. The betterment here, however, has not yet been translated into buying. Domestic consumers are generally remaining aloof, although a few moderate purchases during the week have stimulated hopes that buying interest will broaden after inventories reveal stock positions. The Connecticut basis for electrolytic is unchanged at 5c. for first quarter and 5.12½c. for second quarter delivery. Lake copper has also remained stationary at 5c., delivered New York. Reports that foreign producers will eventually reach an agreement covering production quotas have engendered a more optimistic outlook for the coming year. Though no definite action has yet been taken, the recently expressed willingness of certain foreign producers to cooperate in stabilizing world output is taken by the trade as a harbinger of eventual accord which failed to develop at the international conference.

Tin

The week developed no change from the previous drab situation. In the absence of trading factors, the New York price for spot Straits advanced during the week from 22.55c. to 22.90c. under the sole influence of higher sterling exchange. Activity in London was also quiet. Prices in that market remained fairly steady throughout the week, with today's postings £149 a ton for spot standard, £150 10s. for future standard and £154 5s. for spot Straits. Today's Singapore quotation of £154 10s. was slightly lower than that of a week ago. A 333-ton shrinkage last week brought United Kingdom warehouse stocks down to 29,808 tons, the smallest stocks since Oct. 31, 1931. Shipments from the East up to and including Dec. 17 totaled 2369 tons.

Lead

Most consumers are still not disposed to anticipate their forward requirements, with the result that only a small percentage of January needs has been covered. A relatively steady market situation is sustained, however, by an even flow of daily buying for spot needs. Current calls for lead are well distributed, the only exception being the cable manufacturers, which recently have been lagging in stating their requirements. November shipments of lead aggregated only 22,800 tons contrasted with 29,700 in October. Production in November was 27,300 tons compared with 28,000 tons in the preceding month. Prices are unchanged at 2.87½c. a lb., St. Louis, and 3c., New York.

Zinc

Except for a few spot transactions, this market was lifeless throughout the week. Favorable statistical factors, including low producer and consumer stocks and unusually small volume of unfilled orders, point toward an immediate improvement marketwise in the event that zinc consuming lines experience even a slight increase in activity after the turn of the year. Absence of speculative metal among second hands has further strengthened current prices, which are firmly held at 3.12½c. a lb., East St. Louis, and 3.49½c., New York.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 14	Dec. 15	Dec. 16	Dec. 17	Dec. 19	Dec. 20
Electrolytic copper, N. Y.*	4.75	4.75	4.75	4.75	4.75	4.75
Lake copper, New York	5.00	5.00	5.00	5.00	5.00	5.00
Straits tin, spot, N. Y.	22.55	22.80	22.80	....	22.90	22.90
Zinc, East St. Louis	3.12½	3.12½	3.12½	3.12½	3.12½	3.12½
Zinc, New York	3.49½	3.49½	3.49½	3.49½	3.49½	3.49½
Lead, St. Louis	2.87½	2.87½	2.87½	2.87½	2.87½	2.87½
Lead, New York	3.00	3.00	3.00	3.00	3.00	3.00

*Refinery quotation; price ¼c. higher delivered in Connecticut.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.40c. a lb., New York.
Brass ingots, 85-5-5-5, 5.50c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	24.50c. to 25.50c.
Tin, bar	26.50c. to 28.50c.
Copper, Lake	7.50c. to 8.50c.
Copper, electrolytic	7.25c. to 8.25c.
Copper, casting	7.00c. to 8.00c.
*Copper sheets, hot-rolled	15.37½c.
*High brass sheets	12.50c.
*Seamless brass tubes	15.25c.
*Seamless copper tubes	14.37½c.
*Brass rods	10.25c.
Zinc, slabs	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	3.75c. to 4.25c.
Lead, bar	5.25c. to 6.25c.
Lead, sheets	6.75c.
Antimony, Asiatic	8.00 to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	16.00c.
Solder, ½ and ½	15.50c. to 16.50c.
Babbitt metal, commercial grade	21.00c. to 32.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	26.75c.
Tin, bar	28.75c.
Copper, Lake	6.25c.
Copper, electrolytic	6.25c.
Copper, casting	6.75c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	3.75c. to 4.00c.
Lead, bar	7.25c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	16.50c.
Babbitt metal, high grade	30.75c.
Solder, ½ and ½	16.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	3.75c.	4.25c.
Copper, hvy. and wire	3.50c.	4.125c.
Copper, light and bottoms	2.625c.	3.375c.
Brass, heavy	1.75c.	2.25c.
Brass, light	1.25c.	1.75c.
Hvy. machine composition	2.50c.	3.125c.
No. 1 yel. brass turnings	2.125c.	2.50c.
No. 1 red brass or compos. turnings	2.375c.	3.00c.
Lead, heavy	2.25c.	2.50c.
Zinc	1.25c.	1.625c.
Cast aluminum	3.75c.	5.25c.
Sheet aluminum	8.00c.	9.50c.

Railroad Equipment

Wheeling & Lake Erie has ordered 50 70-ton steel gondola cars from Canton Car Co.

Missouri Pacific is contemplating conversion of seven dining cars into lounge cars.

Texas & Pacific has placed orders for one gas-electric rail motor car and one trailer car with E. G. Budd Mfg. Co.

Hill & Suender, Inc., has purchased one geared locomotive from Heisler Locomotive Works.

St. Louis-San Francisco Railway receivers have been granted authority to retire and dismantle equipment with a ledger value of $4,661,429 as follows: 3874 freight cars, 36 passenger cars, 50 locomotives and 390 units of work. Locomotives have been in use for more than 28 years. Receivers estimate that the value of the salvage to be recovered from the equipment would be $296,450, and that the cost of labor to accomplish such dismantling is $87,180. A scrap dealer will dismantle 2000 of the road's box cars.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.91c.
Del'd New York	1.95c.
Del'd Detroit	1.80c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.70c.
F.o.b. Birmingham	1.75c.
C.i.f. Pacific ports	2.10c.

Billet Steel Reinforcing
(as quoted by distributors)

F.o.b. P'gh mills, 40, 50, 60-ft.	1.60c.
F.o.b. Birmingham, mill lengths	1.75c.
F.o.b. Cleveland	1.60c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.35c. to 1.45c.
F.o.b. Chicago Heights mills	1.50c.

Iron

Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7935c.
F.o.b. Coatesville	1.70c.
F.o.b. Sparrows Point	1.70c.
Del'd New York	1.898c.
C.i.f. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
F.o.b. Lackawanna	1.70c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.86775c.
C.i.f. Pacific ports (standard)	2.10c.
C.i.f. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.05c.
F.o.b. Buffalo	2.00c.

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)

Alloy Quantity Bar Base, 2.45c. to 2.85c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lbs.
2000 (1½% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
6100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars *

Bars, f.o.b. Pittsburgh mill	1.70c.
Bars, f.o.b. Chicago	1.75c.
Bars, Cleveland	1.75c.
Bars, Buffalo	1.75c.
Bars, Detroit	1.90c.
Bars eastern Michigan	1.95c.
Shafting, ground, f.o.b. mill	
1¼ in.	3.00c.
1-3/16 to 1½ in.	2.50c.
1-9/16 to 1⅞ in.	2.35c.
1-15/16 to 2⅜ in.	2.20c.
2-15/16 to 6 in.	2.05c.

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.55c.
No. 10, f.o.b. Chicago mill	1.65c.
No. 10, del'd Philadelphia	1.86c.
No. 10, f.o.b. Birmingham	1.70c.
No. 10, c.l.f. Pacific Coast ports	2.17½c.

Hot-rolled and Annealed

No. 10, Pittsburgh	1.70c.
No. 10, Chicago mills	1.80c.
No. 10, Birmingham	1.85c.
No. 10, Pacific Coast ports	2.32½c.
No. 10, wrought iron, Pittsburgh	3.60c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.10c. to 2.20c.
No. 24, f.o.b. Ch'go mills	2.20c. to 2.30c.
No. 24, del'd Philadelphia	2.41c. to 2.51c.
No. 24, f.o.b. Birmingham	2.35c.
No. 24, c.l.f. Pacific Coast ports	2.85c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.00c.
No. 10 gage, f.o.b. Chicago mills	2.10c.
No. 10 gage, del'd Philadelphia	2.41c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.50c.
No. 20 gage, f.o.b. Chicago mills	2.60c.
No. 20 gage, del'd Philadelphia	2.81c.

Note: Automobile body stock and steel furniture sheets to be quoted henceforth on cold-rolled sheet base prices, with extras for drawing quality.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago mills	2.95c.
No. 24, del'd Philadelphia	3.16c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, c.l.f. Pacific Coast ports	3.50c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh	2.80c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	2.50c. to 2.60c.
No. 20, f.o.b. Pittsburgh	3.00c. to 3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.30c.
No. 28, Chicago mill	2.40c. to 2.50c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(F.o.b. Morganstown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$9.50
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.10
30-lb. coating I.C.	14.90
40-lb. coating I.C.	16.70

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ in.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.45c.
All widths up to 24 in., Chicago	1.55c.
Cooperage stock, P'gh	1.55c. to 1.60c.
Cooperage stock, Chicago	1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.00c.
F.o.b. Cleveland	2.00c.
Del'd Chicago	2.30c.
F.o.b. Worcester	2.20c.
Fender stock, No. 20, gage, Pittsburgh or Cleveland	2.70c. to 2.75c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
(After Dec. 31, extras of 10c a 100 lb. on mixed and joint carloads, 25c on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

	Base per Keg
Standard wire nails	$1.95
Smooth coated nails	1.95
Galvanized nails	3.95

	Base per Lb.
Smooth annealed wire	2.35c.
Smooth galvanized wire	2.80c.
Polished staples	2.50c. to 2.65c.
Galvanized staples	2.75c. to 2.90c.
Barbed wire, galvanized	2.60c.
Woven wire fence No. 9 gage, per net ton	$55.00
Woven wire fence, No. 12½ gage and lighter, per net ton	60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	51½	28½	⅛	+95	+142½
¼ to ⅜	57	34	¼&⅜	+5	+29½
½	62	40½	½	28	10½
¾	65½	55	⅝	33	16½
1 to 3	67½	57	1&1¼	36	20½
			1½	40	23
			2	38	21

Lap Weld

2	61	50½	2	26	12½
2½ to 6	64½	54	2½ to 3½	33	18½
7 and 8	62	51	4 to 6	35	22
9 and 10	60	49	7 and 8	34	21½
11 and 12	59	48	9 to 12	31	16½

Butt Weld, extra strong, plain ends

⅛	48	33	⅛	+17	+40½
¼ to ⅜	53½	38½	¼ & ⅜	+7	+41
½	59	49½	½	28	12½
¾	63½	54	¾	33	17½
1 to 1½	65½	56	1 to 2	39	23
2 to 3	66½	57			

Lap Weld, extra strong, plain ends

2	59	49½	2	34	18½
2½ to 4	62½	53	2½ to 4	39	25
4½ to 6	62	52½	4½ to 6	38	24
7 to 8	58	47	7 & 8	36	22
9 and 10	51½	40½	9 to 12	26	13½
11 and 12	50½	39½			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—4¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel, f.o.b. mill)	26.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and large	$2.40
Spikes, ½-in. and large	2.40
Spikes, boat and barge	2.60
Tie plates, steel	1.75
Angle bars	2.55
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Machine bolts	75
Carriage bolts	75
Lag bolts	75
Plow bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagons	75
C.p.c. and t. square or hex nuts, blank or tapped	75
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Stove bolts in packages, P'gh	75, 25 and 10
Stove bolts in packages, Ch'go	75, 25 and 10
Stove bolts in pkgs., Cleveland	75, 25 and 10
Stove bolts in bulk, P'gh	80
Stove bolts in bulk, Chicago	80
Stove bolts in bulk, Cleveland	80
Tire bolts	60 and 10

Discount of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per Lb.
F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

Discounts to Jobbers

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent off List
Milled cap screws, 1 in. dia. and smaller	80 and 25
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread, ¾ in. and smaller	75 and 10
Upset hex. head cap screws, U.S.S.R. or S.A.E. thread, 1 in. dia. and smaller	80, 25 and 10
Upset set screws, sq. head, 1 in. dia. and smaller	75, 10 and 10
Upset set screws, 1⅛ in. and larger	75 and 10
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. to 6-in., Inclusive, Pittsburgh	$26.00
Rerolling, 4-in. to 6-in., Inclusive, Youngstown	26.00
Rerolling, 4-in. to 6-in., Inclusive, Cleveland	26.00
Rerolling, 4-in. to 6-in., Inclusive, Chicago	26.00
Forging quality, Pittsburgh	31.00
Forging quality, Youngstown	31.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

Slabs

(3 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

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Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$1.75 to $2.00
Foundry, f.o.b. Connellsville prompt	2.75 to 3.25
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b., ovens	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.00 to $1.15
Mine run coking coal, f.o.b. W. Pa.	1.10 to 1.25
Gas coal, ¾-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.20 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	2.80c. to 2.90c.
No. 5 industrial fuel oil	2.45c. to 2.50c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.25c.
No. 4 industrial	4.75c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Penn.	$35.00	$25.00 to $30.00
Maryland	35.00	25.00 to 30.00
New Jer.	$44.00 to 57.00	
Ohio	35.00	25.00 to 30.00
Kentucky	35.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	35.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$38.40 to $41.40
4-in., del'd Chicago	41.40 to 44.40
6-in. and larger, del'd New York	35.30
4-in., del'd New York	38.30
6-in., and larger, Birm'ham	35.30
4-in., Birmingham	38.30

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per Gross ton, f.o.b. Valley furnace:

Basic	$13.50
Bessemer	15.00
Gray Forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	$14.50 to 15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:

Basic	$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$15.50
N'th'n No. 1 fdy.	16.00
Malleable, not over 2.26 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2, Copper free	25.00
Silvery, sil. 8 per cent	23.67
Bess. ferrosil'n, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd St. Louis	$18.30 to 18.80
Southern No. 2 fdy. del'd	14.56
Northern malleable, del'd	18.30 to 18.80
Northern basic, del'd	18.30 to 18.80

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

*Buffalo, No. 2, del'd east	
N. J.	$17.41 to $17.66
East Pa. No. 2 fdy.	14.02
East Pa. No. 2 fdy.	13.52

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

* Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.05
*Buffalo, sil. 2.25 to 2.75	19.05
†Buffalo, sil. 1.75 to 2.25	17.41
†Buffalo, sil. 2.25 to 2.75	17.41
†Ala., sil. 1.75 to 2.25	15.64
†Ala., sil. 2.25 to 2.75	16.14

Freight rates: $5.05 all rail from Buffalo, and $3.41 to $3.91 rail and water from Buffalo when $1 barge and $2 to $2.50 New England freight rate are obtainable; $5.64 rail and water from Alabama to New England seaboard.

* All-rail rate.

† Rail-and-water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$15.00
S'th'n fdy. sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent	21.87
Stand. low. phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; $3.12 from Jackson, Ohio; $6.11 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$13.34 to $13.84
East. Pa. No. 2X	13.84 to 14.34
East. Pa. No. 1X	14.34 to 14.84
Basic (del'd east. Pa.)	13.50 to 14.00
Malleable	14.74 to 18.04
Stand. low phos. (f.o.b. east. Pa. furnace)	20.00 to 21.00
Cop. b'r'g low phos. (f.o.b. furnace)	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$24.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont., in carloads	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$20.50	14%	$23.50
11%	21.00	15%	24.00
12%	21.50	16%	25.00
13%	22.50	17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$18.00	12%	$20.50
7%	18.50	13%	21.50
8%	18.75	14%	22.50
9%	19.00	15%	23.00
10%	19.50	16%	24.00
11%	20.00	17%	25.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr, delivered, in carloads	30c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained Va.	$2.60 to $2.85
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	100.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$46.00
Ton lots or less, per ton	61.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.50
Old range, non-Bessemer, 51.50% iron	4.35
Mesabi Bessemer, 51.50% iron	4.35
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.10

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 69½% iron	9c.
Iron, basic or foundry, Swedish, average 65% iron	8c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	9c.
Manganese, Caucasian, washed 52%	*23c.
Manganese, African, Indian, 50-52%	*21c. to 22c.
Manganese, Brazilian, 46 to 48%	*13c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid	$10.00

	Per Gross Ton
Tungsten, domestic scheelite	$8.00 to $10.40
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic seaboard	16.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic seaboard	18.00

* Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	$9.00 to $10.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	12.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$16.00 to 16.75
Domestic, No. 1 ground bulk, 85 to 88% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$8.50 to $9.00
No. 2 heavy melting steel	7.00 to 7.50
No. 2 railroad wrought	8.50 to 9.00
Scrap rails	8.50 to 9.00
Rails 3 ft. and under	10.00 to 11.00
Sheet bar crops, ordinary	9.00 to 9.50
Compressed sheet steel	8.25 to 8.75
Hand bundled sheet steel	7.00 to 7.50
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
No. 1 cast	9.00 to 10.00
Railr. knuckles and couplers	9.50 to 10.00
Rail. coil and leaf springs	9.50 to 10.00
Rolled steel wheels	9.50 to 10.00
Low phos. billet crops	11.00 to 11.50
Low phos.sheet bar crops	11.00 to 11.50
Low phos. plate scrap	10.00 to 10.50
Low phos. punchings	10.50 to 11.00
Steel car axles	11.00 to 11.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$5.00 to $5.50
Shoveling steel	5.00 to 5.50
Frogs, switches and guards	$5.00 to $5.50
Hydraulic comp. sheets	8.75 to 9.25
Drop forge flashings	4.00 to 4.50
No. 1 busheling	3.50 to 4.00
Rolled carwheels	7.00 to 7.50
Railroad tires	8.00 to 8.50
Railroad leaf springs	8.00 to 8.50
Axle turnings	4.50 to 5.00
Steel couplers and knuckles	7.00 to 7.50
Coil springs	8.50 to 9.00
Axle turnings (elec. fur.)	5.50 to 6.00
Low phos. punchings	8.00 to 8.50
Low phos. plates, 12 in. and under	8.00 to 8.50
Cast iron borings	3.00 to 3.50
Short shoveling turnings	3.00 to 3.50
Machine shop turnings	3.00 to 3.50
Rerolling rails	7.50 to 8.00
Steel rails, less than 3 ft.	8.25 to 8.75
Steel rails, less than 2 ft.	8.75 to 9.25
Angle bars, steel	7.00 to 7.50
Cast iron carwheels	7.00 to 7.50
Railroad malleable	5.50 to 6.00
Agricultural malleable	5.00 to 5.50
* Relaying rails, 56 to 60 lb.	15.00 to 17.00
* Relay rails, 65 lb. and up	18.00 to 23.00

Per Net Ton

Iron angle and splice bars	$5.00 to $5.50
Iron arch bars, transoms	5.00 to 5.50
Iron car axles	11.00 to 11.50
Steel car axles	8.50 to 9.00
No. 1 railroad wrought	4.00 to 4.50
No. 2 railroad wrought	4.50 to 5.00
No. 1 busheling	2.50 to 3.00

2 busheling	$2.00 to	$2.50
motive tires, smooth	7.50 to	8.50
e and flues	1.25 to	1.75
1 machinery cast	6.25 to	6.75
automobile cast	6.75 to	7.25
1 railroad cast	5.25 to	5.75
1 agricultural cast	5.75 to	6.25
e plate	5.50 to	6.00
e bars	5.00 to	5.50
e shoes	5.75 to	6.25

Relaying rails, including angle bars and match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

1 heavy melting steel	$6.50 to	$7.00
2 heavy melting steel	5.00 to	5.50
1 railroad wrought	7.50 to	8.00
Rolled sheets	4.00 to	4.50
Hydraulic compressed, new	5.50 to	6.00
Hydraulic compressed, old	4.00 to	4.50
Machine shop turnings	3.50 to	4.00
Heavy axle turnings	5.50 to	6.00
Cast borings	3.50 to	3.75
Heavy breakable cast		8.50
Stove plate (steel works)	6.00 to	6.50
No. 1 low phos. heavy	10.00 to	10.50
Railroad springs and knuckles	8.00 to	8.50
Rolled steel wheels	8.00 to	8.50
No. 1 blast furnace	3.50 to	3.75
Wrought iron and steel pipe	6.50 to	7.00
Shafting	12.00 to	13.00
Steel axles	12.00 to	13.00
No. 1 forge fire	5.50 to	6.00
Cast iron carwheels	8.50 to	9.00
No. 1 cast	8.00 to	9.00
Cast borings (chem.)	8.00 to	10.00
Steel rails for rolling	9.00 to	9.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.25
No. 2 heavy melting steel	6.25 to	6.50
Compressed sheet steel	6.00 to	6.50
Long bundled sheet stampings	4.00 to	4.50
Drop forge flashings	5.25 to	5.75
Machine shop turnings	3.25 to	3.50
Short shoveling turnings	4.00 to	4.50
No. 1 bushelling	5.25 to	5.50
Steel axle turnings	5.00 to	5.50
Low phos. billet crops	10.00 to	11.00
Cast iron borings	3.75 to	4.00
Mixed borings and short turnings	3.75 to	4.00
No. 2 bushelling	3.75 to	4.00
No. 1 cast	7.50 to	8.00
Railroad grate bars	5.00 to	5.50
Stove plate	5.00 to	5.50
Rails under 3 ft	8.50 to	9.00
Rails for rolling	8.50 to	9.00
Railroad malleable	6.75 to	7.06
Cast iron carwheels		8.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$6.00 to	$6.50
No. 2 heavy melting scrap	5.50 to	6.00
Scrap rails	6.00 to	6.50
New hydraul. comp. sheets	5.50 to	6.00
Old hydraul. comp. sheets		4.50
Drop forge flashings	5.50 to	6.00
No. 1 bushelling	5.50 to	6.00
Hvy. steel axle turnings		6.00
Machine shop turnings	4.00 to	4.50
Knuckles and couplers		10.00
Coil and leaf springs		10.00
Rolled steel wheels		10.00
Low phos. billet crops	9.00 to	9.50
Short shov. steel turnings	5.50 to	6.00
Short mixed borings and turnings	3.75 to	4.25
Cast iron borings	3.75 to	4.25
No. 2 bushelling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	10.00 to	11.00
No. 1 machinery cast	9.50 to	10.00
No. 1 cupola cast	8.50 to	9.00
Stove plate	6.50 to	7.00
Steel rails, 3 ft. and under	9.25 to	9.75
Cast iron carwheels	8.00 to	9.00
Industrial malleable	7.00 to	7.50
Railroad malleable	7.00 to	7.50
Chemical borings	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.50 to	$8.00
Scrap steel rails	8.00 to	8.50
Short shoveling turnings		4.00
Stove plate		6.00
Steel axles		9.00
Iron axles		9.00
No. 1 railroad wrought	4.50 to	5.00
Rails for rolling	8.00 to	8.50
No. 1 cast		8.50
Grate bars		8.50
Cast iron borings, chem		8.50

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$5.50 to	$6.00
No. 1 heavy melting	5.00 to	5.50
No. 2 heavy melting	5.00 to	5.50
No. 1 locomotive tires	5.00 to	5.50
Misc. stand-sec. rails	5.25 to	5.75
Railroad springs	6.25 to	6.75
Rolled sheets	2.00 to	2.50
No. 1 railroad wrought	5.00 to	5.50
No. 1 bushelling	3.50 to	4.00
Cast iron borings and turnings	2.75 to	3.25
Steel rails	7.00 to	7.50
Rails for rolling	7.00 to	7.50
Machine shop turnings	2.00 to	2.50
Short turnings	3.00 to	3.50
Steel car axles	8.50 to	9.00
Iron axles	11.00 to	11.50
Cast iron bars and trans	4.00 to	4.50
No. 1 railroad wrought	3.50 to	4.00
Rails less than 3 ft	7.00 to	7.50
Cast angle bars	6.00 to	6.50
Cast iron carwheels	$5.00 to	$5.50
No. 1 machinery cast	6.50 to	7.00
Railroad malleable	4.00 to	4.50
No. 1 railroad cast	6.25 to	6.75
Stove plate	6.00 to	6.50
Relay, rails, 60 lb. and under	16.00 to	16.50
Relay, rails, 60 lb. and over	20.00 to	21.00
Agricult. malleable	4.00 to	4.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$3.50 to	$4.50
No. 2 heavy melting steel		3.00
Heavy melting steel (yard)		1.50
No. 1 hvy. breakable cast	5.00 to	5.25
Stove plate (steel works)	2.50 to	2.90
Machine shop turnings	0.75 to	1.25
Short shoveling turnings	0.75 to	1.25
Cast borings	0.50 to	1.00
No. 1 blast furnace	0.50 to	1.00
Steel car axles	8.00 to	8.50
Spec. iron and steel pipe	2.50 to	2.75
Forge fire	2.75 to	3.00
No. 1 railroad wrought	4.00 to	4.50
No. 1 yard wrought long	3.25 to	3.50
Rails for rolling	5.00 to	5.50
No. 1 cast		4.50
No. 2 cast		4.50
Stove plate (foundry)		4.50
Malleable cast (railroad)	4.00 to	4.50
Cast borings (chemical)	6.00 to	6.50

Per gross ton, delivered local foundries:

No. 1 machinery cast		$9.00
No. 1 hvy. cast (cupola size)	7.50 to	8.00
No. 2 cast	4.00 to	4.50

BOSTON

Dealer's buying prices per gross ton:

No. 1 heavy melting steel	$3.00 to	$3.25
Scrap T rails	2.50 to	2.75
Machine shop turnings	0.80 to	1.00
Cast iron borings		1.05
Bundled skeleton, long	2.00 to	2.10
Forge flashings	3.00 to	3.50
Blast furnace scrap	0.90 to	1.00
Forge scrap	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	4.50 to	5.00
Cast iron borings, chemical	7.00 to	7.25

Per gross ton delivered consumers' yards:

Textile cast	$7.00 to	$7.50
No. 1 machinery cast	7.50 to	8.00
Stove plate	5.00 to	5.25
Railroad malleable	8.00 to	8.50

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$3.00 to	$3.50
Scrap rails for melting	6.00 to	6.50
Loose sheet clippings	1.50 to	2.00
Bundled sheets	3.75 to	4.25
Cast iron borings	3.25 to	3.75
Machine shop turnings	3.00 to	3.50
No. 1 bushelling	4.50 to	5.00
No. 2 bushelling	2.75 to	3.25
Rails for rolling	6.50 to	7.00
No. 1 locomotive tires	7.50 to	8.00
Short rails	9.00 to	9.50
Cast iron carwheels	6.50 to	7.00
No. 1 machinery cast	8.25 to	8.75
No. 1 railroad cast	7.75 to	8.25
Burnt cast	$4.25 to	$4.75
Stove plate	4.25 to	4.75
Agricultural malleable	6.75 to	7.25
Railroad malleable	7.00 to	7.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$4.50 to	$5.00
Borings and short turnings	2.00 to	2.50
Long turnings	1.50 to	2.00
No. 1 machinery cast	7.75 to	8.25
Automotive cast	8.00 to	8.50
Hydraul. comp. sheets	4.00 to	4.50
Stove plate	3.00 to	3.50
New No. 1 bushelling	3.50 to	4.00
Old No. 2 bushelling	1.50 to	2.00
Sheet clippings	1.25 to	1.75
Flashings	2.75 to	3.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	10.00	8.50
Malleable	10.00	8.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	3.45c.
Hoops and bands, under ¾ in.	2.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	3.10c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.74
Spikes, large	2.40c.
Small	2.65c. to 2.80c.
Ront	2.90c.
Track bolts, all sizes, per 100 count,	70 per cent off list.
Machine bolts, 100 count,	70 per cent off list.
Carriage bolts, 100 count,	70 per cent off list.
Nuts, all styles, 100 count,	70 per cent off list.
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.75
Wire, galv. soft, base per 100 lb.	3.20
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.35

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforc. bars, billet steel	1.35c to 1.40c.
Rail steel reinforment	1.15c. to 1.25c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.00c.
Flats and squares	3.50c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.45c.
Galv. sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	2.75c.
Spikes (3/16 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural	3.75c.
Rivets, boiler	3.75c.
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Coach and lag screws	70
Hot-pressed nuts, sq., tap. or blank	70
Hot-pressed nuts, hex., tap. or blank	70
Hex. head cap screws	80 and 10
Cup point set screws	75 and 10
Flat head bright wood screws	52½ and 10
Sorting cotters	60
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$1.50 off list
No. 8 black ann'l'd wire, per 100 lb.	$3.15
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

NEW YORK

	Base per Lb.
Plates and struc. shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, rerod, charcoal	6.00c. to 6.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.20c.
Flats and squares	3.80c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.20c.
Bands	3.20c.
Hot-rolled sheets (No. 10)	3.00c.
Hot-rolled ann'l'd sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ⅛ x ⅝ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10
Boiler Tubes	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.35c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10) up to and inc. 48 in. wide	3.00c.
over 48 in. wide	3.15c.
Black corrug. sheets (No. 24)	3.75c.
Gal. corrug. sheets	4.05c.
Structural rivets	4.00c.
Boiler rivets	4.00c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	70
Less than 200 lb.	60
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	70
Less than 200 lb.	60

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.45c.
*Structural shapes	2.45c.
*Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-fin. steel, rounds and hex.	3.25c.
Cold-fin. steel, sq. and flats	3.85c.
*Steel hoops	3.00c.
*Steel bands, No. 12 to 3/16 in. incl.	2.75c.
Spring steel	5.00c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	3.75c.
*Hot-rolled annealed sheets (No. 10)	2.90c.
Diam. pat. floor plates, ¼ in.	5.00c.
Swedish iron bars	5.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deductions on orders aggregating 1000 lb. or over.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex.	2.95c.
Cold-fin. flats and sq.	3.45c.
Flat rolled steel under ¼ in.	3.00c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.75
No. 9 galv. wire, per 100 lb.	3.20
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rails steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex	3.32c.
Squares and flats	3.82c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot-rolled sheets (No. 10)	3.50c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 19 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$15.87
4-in.	34.57
Lap-welded steel boiler tubes, 2-in.	15.12
4-in.	32.96

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.20c.
Soft steel bars	2.95c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.50c.
Rounds and hex.	3.00c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.05c.
Bands	3.30c.
Hoops	3.95c.
Hot-rolled sheets (No. 10)	3.15c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
*Beams, channels, angles, tees, zees	3.00c.
*H beams and shapes	3.00c.
*Plates—sheared, tank, and univ. mill, ¼ in. thick and heavier	3.00c.
Floor plates, diamond pattern	5.25c.
*Bar and bar shapes (mild steel)	2.90c.
*Bands 3/16 in. thick and No. 12 ga. incl.	3.40c.
Hoops, No. 14 ga. and lighter	4.90c. to 5.40c.
*Half rounds, hf. ovals, ovals and bevels	4.15c.
Tire steel, hd. edge 1½ x ⅛ in. and larger	4.50c.
Smaller sizes	4.75c.
Cold-finished rounds and hexagons	3.60c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.10c.
*Blue annealed sheets No. 10 ga.	3.15c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Blued stove pipe sheets No. 24 ga.	3.90c.
Galvanized steel sheets No. 24 ga.	4.60c.
Lead coated (long terne) No. 24 ga.	5.00c.

*Base prices for 15,000 lb. orders, extras apply for smaller quantities.

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates and struc. shapes, ¼-in. and heavier	3.15c.	3.30c.	3.00c.
Soft steel bars	3.15c.	3.30c.	3.00c.
Reinforcing bars	3.00c.	3.00c.	3.00c.
Hot-rolled annealed sheets No. 24	3.90c.	4.20c.	4.50c.
Hot-rolled sheets No. 10	3.75c.	3.50c.	4.00c.
Galv. sheets (No. 24)	4.55c.	4.50c.	5.00c.
*Struc. rivets, ½ in. and larger, less than 1000 lb.	5.75c.	5.00c.	4.00c.
*Cold-finished steel Rounds	5.50c.	5.50c.	4.50c.
Squares and hexagons	6.75c.	6.75c.	5.75c.
Flats	7.25c.	7.25c.	6.75c.
Nails—base per keg less carload			
Com. 4-60d	$2.40	$2.40	$2.40
8 Box 4-20d	2.40	2.40	2.40
Finish 6 & 8d	2.40	2.40	2.40
All others	2.65	2.65	2.65

*Subject to deductions for quantity.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Electrolux, Inc., 500 Fifth Avenue, New York, manufacturer of electric cleaners and parts, refrigerating equipment, etc., has purchased former one-story plant of Dalton Machine Tool Co., 53,000 sq. ft. floor space, at South Beach, Conn., more recently used by Welte Tripp Co., manufacturer of organs, and will occupy for new plant. Facilities will be installed for employment of about 200 persons.

Merchants Refrigerating Co., 17 Varick Street, New York, let general contract to Barney-Ahlers Construction Corpn., 110 West Fortieth Street, for extensions and improvements in cold storage and refrigerating plant on West Sixteenth Street. Cost about $200,000 with equipment.

Superintendent of Lighthouses, Staten Island, N. Y., asks bids until Dec. 28 for about 86,500 lb. of open link iron buoy chains, from ⅞ to 1⅛-in., and 11,138 lb. of open link iron bridle chains (Proposal 42041); 100 wrought iron connecting shackles for 1⅛-in. chain cables, about 1500 lb., and 4830 lb. of wrought iron buoy swivels (Proposal 42040).

Monroe Eliminator Co., Inc., Middletown, N. Y., has been organized by Fred R. Monroe, R.F.D. No. 2, Middletown, and Roy D. Monroe, 10 Houston Avenue, same place, to manufacture electrical equipment and devices.

Sinclair Refining Co., 45 Nassau Street, New York, is arranging an expansion and modernization program at oil refineries, bulk oil storage and distributing terminals, and other properties. Cost about $20,000,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for one 2500-kw. turbo-alternator with accessories for Brooklyn Navy Yard (Specification 7175).

Freeport Sulphur Co., 122 East Forty-second Street, New York, affiliated with Freeport Texas Co., same address, has engaged J. F. Coleman Engineering Co., Hibernia Bank Building, New Orleans, consulting engineer, to prepare plans for new sulphur mining and refining plant at Lake Grande Ecaille (Lake Washington), La., to include power plant, machine shop, water-treating plant and other structures. Pipe line will be built and housing development for employees. Cost over $1,000,000 with equipment.

Pathe Engineering & Tool Mfg. Corpn., Long Island City, has been organized by Joseph Strobel, 2827 Forty-sixth Avenue, and Hugh M. Lyman, 160-03 Laburnam Avenue, Flushing, L. I., to manufacture tools and other equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for one locomotive type fire tube boiler, 100-hp. rating (Schedule 9298) for Naval Air Station, Lakehurst, N. J.

Arcturus Radio Tube Co., 720 Frelinghuysen Avenue, Newark, manufacturer of radio tubes and equipment, is running on full six-day week schedule, with night force in several departments.

Jutting Airwing Corpn., Sussex, N. J., has been organized, capital $100,000, by Bernhard G. Jutting, Granberry Lake, N. J., and Edwin H. Wills, Stanhope, N. J., to manufacture aircraft equipment and parts.

J. J. Hockenjos Co., 829 Broad Street, Newark, manufacturer of paints, varnishes, etc., contemplates early call for bids on revised plans for three-story and basement plant. Cost over $800,000 with equipment. Henry D. Scudder, Jr., 9 Clinton Street, is architect and engineer.

Peter Wendel & Sons, Inc., 171 Badger Avenue, Newark, manufacturer of commercial wagons, parts, bodies, etc., has plans for one-story and basement addition. Cost about $25,000 with equipment.

Hillsdale Screen Co., Philadelphia, recently organized, has leased three-story building at Fifth and Wood Streets for manufacture of wire screens, screen doors, etc.

City Council, Bethlehem, Pa., plans early call for bids for Diesel engine-electric power plant at South Side pumping station, primarily for power supply for municipal lighting system. Cost over $60,000 with equipment. R. L. Fox is city engineer.

State Department of Public Works, Harrisburg, Pa., is asking bids on general contract until Jan. 4 for one-story equipment storage and distribution building on local site. Thomas H. Atherton, Wilkes-Barre, Pa., is architect.

Universal Auto Accessory Co., Philadelphia, automobile equipment and accessories, has leased building at 820 N. Broad Street, for new storage and distributing plant.

York Ice Machinery Corpn., York, Pa., has secured contracts from Government for refrigerating machinery for air-conditioning service in new Department of Justice Building and new United States Post Office Building, Washington.

Niagara Frontier Food Terminal, 1500 Clinton Street, Buffalo, has plans for new multi-story storage and distributing plant. Cost about $100,000 with mechanical-handling and other equipment.

Postindex Co., Inc., Jamestown, N. Y., manufacturer of visible card systems, metal files, cabinets, etc., a subsidiary of Art Metal Construction Co., same place, has arranged for manufacture of its specialties for Canadian market at plants of Dominion Tool & Machine Co., Ltd., and Business Systems, Ltd., Toronto.

Gould's Pumps, Inc., Seneca Falls, N. Y., has acquired Hydroil Corpn., Lebanon, Ind., manufacturer of oil purifying apparatus. Lebanon plant is being discontinued and business and equipment transferred to Seneca Falls plant of Gould company. D. B. Clark, vice-president of Hydroil, and W. P. Alexander, factory and field representative, will join Gould organization, which will continue to manufacture Hydroil centrifugal purifying machines at Seneca Falls, with production planned to begin Jan. 1, 1933.

SOUTH ATLANTIC

American Oil Co., American Building, Baltimore, has plans for new bulk oil storage and distributing plant on 5-acre tract at South Richmond, Va., with main unit 50 x 226 ft. Cost close to $75,000 with equipment. Bids asked on general contract.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 29 for steel machine bolts, steel rivets, machine bolt nuts, brass bolts, brass nuts, gate valves, check valves, malleable iron unions, brass or bronze pipe fittings, malleable iron pipe fittings, cast iron flanges, wire rope, plow steel rope, etc.; and for eight ½-ton, 12 1-ton and eight 2-ton capacity chain hoists, six hand trucks and other equipment (Schedule 2821).

Brantley County Utilities, Inc., Nahunta, Ga., recently organized by Sylvan Byck, Savannah, Ga., and associates, plans erection of Diesel engine-electric generating plant for light and power service at Nahunta and vicinity; also, for waterworks, with pumping plant, pipe lines, etc. Cost over $80,000 with equipment.

Zaban Mattress & Box Spring Co., 1 West Cary Street, Richmond, Va., manufacturer of bed springs, etc., has plans for new two-story and basement factory, 55 x 150 ft. Cost about $35,000 with equipment.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Jan. 10 for automobile parts, including ball bearings, steel balls, sanding disks, hardware, babbitt metal, piston rings, fire extinguishers, etc. (Circular 55).

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Jan. 4 for one gasoline engine-operated crane for marine railway at Navy Yard, Charleston, S. C., unit to have capacity of 10,000 lb. and reach of 35 ft. (Specification 7103); electrical distributing system at Naval Ammunition Depot, St. Juliens Creek, Va. (Specification 7108).

Lehigh Portland Cement Co., Allentown, Pa., has resumed operations at branch mill at Fordwick, Va., after shut down of several months, recalling about 200 men.

Wak, Inc., Charlotte, N. C., has been organized by F. W. Warrington and W. A. Kennedy, 2021 Beverly Drive, to manufacture counting and tabulating equipment and devices.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 30 for revolving airway beacons (Schedule 9173); until Jan. 4, one cold cut-off saw (Schedule 9241), one bending roll machine (Schedule 9242), one rotary shear, all motor driven (Schedule 9240), axes, hammers and hatchets (Schedule 9275), calipers, dividers, gears, planes and squares (Schedule 9294), vises (Schedule 9288), clamps and punches (Schedule 9295), rules and tapes (Schedule 9289), pliers and nippers (Schedule 9290), 60 water gages, complete with fittings, frames, glasses and drain valves (Schedule 9308), screw-drivers (Schedule 9286), steel figures and letters (Schedule 9287), six centrifugal type, motor-driven lubricating oil purifiers and spare parts (Schedule 9305) all for Eastern and Western yards; one cooling tower (Schedule 9259) for Sewells' Point, Va., Navy Yard; 1065 sets wire boiler tube brushes (Schedule 9260) for Brooklyn and Mare Island yards; 38 1-ton capacity and one 3½-ton capacity chain hoists (Schedule 9276) for Boston, Brooklyn, Mare Island and Puget Sound yards; 18 coal shovels and 1483 hand shovels (Schedule 9278) for Washington, Mare Island, Brooklyn and other navy yards.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for one-story addition, 100 x 126 ft. to mechanical shop at naval air station, Coco Solo, Canal Zone (Specification 7111).

CENTRAL DISTRICT

Department of Supplies, City-County Building, Pittsburgh, W. R. Dunlap, director, asks bids until Dec. 28 for gate valves and parts, cast iron pipe, special castings, fire hydrants and parts, sewer pipe and fittings, etc.

Village Council, Wesleyville, Pa., plans installation of pumping machinery and other equipment in connection with new municipal waterworks. Cost about $100,000. George C. Diehl, Inc., 33 South Division Street, Buffalo, N. Y., is consulting engineer.

Indiana Motors Corpn., Marion, Ind., a subsidiary of Studebaker Corp., South Bend, Ind., will soon remove its manufacturing, engineering and sales divisions to plant of White Motor Co., Cleveland, another subsidiary of Studebaker Corpn., where truck production will be concentrated. Work is under way on removal of motor truck department of Pierce-Arrow Motor Car Co., Buffalo, another affiliation, to White plant. It is proposed to continue production of Studebaker motor trucks at South Bend.

Cleveland Home Brewing Co., 2501 East Sixty-first Street, Cleveland, is considering extensions and improvements in plant, including new equipment. Cost about $75,000 with machinery.

B. F. Goodrich Co., Akron, Ohio, is increasing operations at rubber mill of its subsidiary, Miller Products Division, recalling over 200 employees.

City Council, Conneaut, Ohio, plans installation of pumping machinery and other equipment in connection with extensions and improvements in municipal waterworks. Cost over $225,000. George B. Gascoigne, Leader Building, Cleveland, is consulting engineer.

Libbey-Owens-Ford Co., Nicholas Building, Toledo, Ohio, manufacturer of sheet glass, is increasing production at plants at East Toledo and Rockford, recalling over 1000 workers during past 30 days. Safety glass plant at East Toledo is running at capacity, with day and night forces.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Jan. 3 for 401 bolt and bracket assemblies, gun trunnion, and 693 gun mounting post assemblies (Circular 279); until Dec. 29, 330 airspeed tube assemblies (Circular 283); until Jan. 4, tail wheel assemblies (Circular 281).

Darling & Co., Inc., 4201 South Ashland Avenue, Chicago, manufacturer of meat-packing by-products, has awarded general contract to Henry J. Spieker Co., 1418 Elm Street, Toledo, Ohio, for extensions and improvements in plant at Toledo. Cost about $85,000 with equipment.

Frigidaire Corpn., Dayton, Ohio, division of General Motors Corpn., Detroit, is developing new line of air-conditioning equipment for railroad cars, and will organize department for extensive output soon.

Gordon Oil Co., 270 North Fourth Street, Columbus, Ohio, J. P. Gordon, president, plans new bulk oil storage and distributing plant near Cambridge, Ohio. Cost about $50,000 with equipment.

Board of Works, City Hall, Fort Wayne, Ind., asks bids until Jan. 5 for underground

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high-tension transmission line from municipal electric power plant on Clinton Street to site of hydroelectric power development. Cost close to $1,000,000. Froelich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is consulting engineer.

Stokley Brothers Canning Co., Greenwood, Ind., will take bids soon on revised plans for new two-story addition, 100 x 120 ft., primarily for storage and distribution, to replace unit recently destroyed by fire. Cost over $60,000 with equipment.

City Council, Albion, Mich., is considering erection of a municipal electric light and power plant. Cost over $80,000 with equipment. D. L. Boyd is in charge.

Academy Mfg. Co., Inc., 2982 East Jefferson Avenue, Detroit, has been organized by J. Walter Vick, 15826 Woodingham Drive, to manufacture radio parts and equipment.

G. A. Mueller, 1346 Broadway, Detroit, architect, has plans for new brewing plant at Indianapolis, one and five-stories, for company whose name is temporarily withheld. Cost over $200,000 with equipment.

NEW ENGLAND

Mason & Parker Mfg. Co., Winchendon, Mass., manufacturer of toys, etc., is planning rebuilding of No. 3 plant, recently destroyed by fire. Loss about $35,000 with equipment.

New England Milled Nut Co., Inc., Springfield, Mass., has been organized by Guy C. Worrell and Eber R. Crowningshield, 2 Provin Terrace, Westfield, Mass., capital $50,000, to manufacture nuts, bolts and kindred products.

Shepherd Broadcasting Service, 1 Winter Place, Boston, has plans for new broadcasting station at Pleasure Beach, Bridgeport, Conn. Cost over $40,000 with equipment. Monks & Johnson, 99 Chauncy Street, Boston, are consulting engineers.

Providence Dressed Meat Co., 45 Concord Street, Pawtucket, R. I., has asked bids on general contract for new one-story meat-packing plant, 100 x 120 ft. Cost close to $30,000 with equipment.

Harvard Brewing Co., Lowell, Mass., has been acquired by new interests, headed by Walter Blumenthal, senior partner of Hallgarten & Co., 44 Pine Street, New York, bankers. Company will be reorganized and plant expansion and modernization program carried out. Cost over $600,000 with equipment. E. F. Lange will be president and Mr. Blumenthal, treasurer.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for two 300-hp. watertube boilers, with superheaters, pulverized fuel equipment and auxiliaries (Specification 7158), superheaters, soot blowers, piping and other accessory equipment (Specification 7164) for Portsmouth, N. H., Navy Yard.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for one motor-driven tool and cutter grinder (Schedule 9297) for Portsmouth Navy Yard.

MIDDLE WEST

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Dec. 27 for 200 transmitters (Circular 18).

Best Malt Products Co., 1317 Fletcher Street, Chicago, has organized Best Brewing Co., as an affiliated interest, and contemplates plant expansion and improvements. Cost over $200,000 with machinery. Charles Hasterlik is president of new organization.

Chieftain Batteries, Inc., 2326 West Broadway, Council Bluffs, Iowa, manufacturer of electric storage batteries, has awarded general contract to E. W. Ward, Kearney, Neb., for new two-story and basement factory, 60 x 75 ft., at Hastings, Neb.

City Council, Executive Committee, Belleville, Ill., is considering erection of a municipal electric light and power plant in conjunction with municipal waterworks. Cost $750,000 with equipment. Pearse, Greeley & Hansen, 6 North Michigan Avenue, Chicago, consulting engineers, have made survey for waterworks project.

Union Public Service Co., Pioneer Building, St. Paul, Minn., has authorized transmission line from Ghent to Green Valley, Minn., connecting with power line from power station at Canby, Minn.

Homestake Mining Co., Lead, S. D., has begun erection of one-story cyanide mill, 80 x 300 ft., at local gold-mining properties, to be equipped with crushing, separating and other machinery, conveyors, etc. Battery of eight cyanide tanks, 45 ft. diameter, will be installed. Cost over $200,000 with machinery.

City Council, Colorado Springs, Colo., plans extensions and improvements in municipal waterworks, including pumping and other equipment. Cost over $25,000.

City Council, Manning, Iowa, is planning erection of new municipal electric light and power plant. Fund of $135,000 is being arranged for building and equipment.

Iowa-Nebraska Light & Power Co., Lincoln, Neb., plans new transmission line in Harrison County, Iowa.

Kubisiak Brothers Machine Co., Stevens Point, Wis., has been organized by Stephen Kubisiak, Wisconsin Rapids, Wis., and Peter Kubisiak, Chicago, and is equipping a general machine shop with welding department at 201 Normal Avenue, Stevens Point.

Western Malleables, Inc., Beaver Dam, Wis., has received releases from automobile manufacturers on contracts for castings which will keep present force of 230 men busy until after Jan. 1. November output of Western company amounted to 420 tons, according to H. L. Kirsh, general manager.

L. Ziegler Brewing Co., Beaver Dam, Wis., has placed general contract with Hutter Construction Co., Fond du Lac, Wis., for complete rehabilitation of plant and equipment.

SOUTH CENTRAL

United States Bobbin & Shuttle Co., Providence, R. I., manufacturer of textile mill equipment, will establish branch plant in three-story building at Johnson City, Tenn., for production of bobbin blanks and other specialties.

United States Engineer Office, Memphis, Tenn., asks bids until Dec. 27 for one plate roll, cutting and threading machine, punch and shear, radial drill, all motor driven, metal saw (Circular 374); until Dec. 28, four cast steel dredge pump impellers, two cast steel dredge pump cases, one cast steel six-blade dredge cutter, radial elbow assemblies, four cast steel ball joints, flanges, trash rack assemblies, etc. (Circular 378).

Lerio Patent Cup Co., 201 South Royal Street, Mobile, Ala., manufacturer of turpentine cups and other equipment for naval store production, plans extensions and improvements in branch plant at Brunswick, Ga., including new one-story all-steel unit. Cost over $24,000 with equipment.

Superintendent of Lighthouses, New Orleans, asks bids (no closing date stated) for 30 38-ft. high and 13 24-ft. high galvanized skeleton steel towers, to be delivered at Mobile, Ala., or Galveston, Tex.

SOUTHWEST

Sealright Co., Inc., Fairfax and Rickel Roads, Kansas City, Kan., manufacturer of paper caps, containers, etc., has arranged with Union Pacific Railroad Co., owner of plant occupied under lease, for one-story addition, 70 x 153 ft., for manufacture of paper cans. General contract let to W. K. Martin Construction Co., Dwight Building, Kansas City, Mo. Cost about $30,000 with equipment. Company is a subsidiary of Oswego Falls Corpn., Fulton, N. Y.

Department of Public Works, Little Rock, Ark., has secured fund of $30,000 for new hangar, 100 x 140 ft., at municipal airport, with three mechanical and repair shops, and will have plans drawn at once. Howard Eichenbaum, 113 West Third Street, is architect.

Constructing Quartermaster, William Beaumont General Hospital, El Paso, Tex., asks bids until Jan. 17 one one-story utility warehouse and shop.

Wheeler Boiler Corpn., San Antonio, Tex., has been organized by Frederick Zendall and Bart Moore, Jr., Smith-Young Tower Building, to manufacture boilers, tanks and other plate products.

Standish Oil Co., Borger, Tex., is planning extensions and improvements in oil refining at Alma, near Borger, including additional equipment. Cost over $45,000. Company is a subsidiary of Phillips Petroleum Co., Bartlesville, Okla.

Construction Service, Veterans' Administration, Washington, asks bids until Jan. 17 for water-softening plant for institution at Legion, Tex.

City Council, Corsicana, Tex., is planning new municipal electric light and power plant, and electric distributing system. Cost about $200,000 with equipment. Financing in that sum being arranged.

City Council, Port Arthur, Tex., plans installation of tanks and other equipment for storage service for municipal water system. Cost about $60,000. R. E. Rohrman is city engineer.

Gibson Meter Co., Inc., Mission, Tex., has been organized by J. E. Gibson and B. M. Strong, Mission, to manufacture water meters and kindred equipment.

Board of Education, Kilgore, Tex., plans manual training department in new one and two-story high school, for which bonds for $200,000 have been authorized. Phelps & DeWees, Gunter Building, San Antonio, Tex., are architects; E. S. White and M. E. DeFee, Henderson, Tex., associate architects.

PACIFIC COAST

Municipal Light and Power Department, Pasadena, Cal., has acquired property, 380 x 415 ft., for new electric power sub-station. Cost $190,000 with equipment.

Lasco Brake Products Co., Twenty-sixth and Magnolia Streets, Oakland, Cal., manufacturer of mechanical equipment, is planning extensions and improvements, including additional equipment. Cost over $60,000.

Shell Oil Co., Shell Building, San Francisco, operating oil refineries at Martinez, Wilmington and Oilfields, Cal., is planning expansion and modernization program, including extensions in refineries and installation of equipment, oil storage and distributing plants, and additional oil-producing facilities. Cost about $7,500,000.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Jan. 4 for 100-kw. gasoline engine-generating set, with gasoline tanks, switchboard and accessories (Specification 7050) for Naval Ammunition Depot, Hawthorne, Nev.

Consolidated Steel Pipe & Tank Co., Phoenix, Ariz., Franklin Hegeman, president, is planning new one-story works, 80 x 150 ft., for production of steel plate specialties, pipe, etc. Electric traveling crane and electric hoists will be installed. Cost about $70,000 with equipment.

Monarch Refineries, 412 West Sixth Street, Los Angeles, Charles W. Fourl, president is considering erection of new oil refinery in Signal Hill oil district, with division for gasoline production. Cost close to $100,000 with equipment.

Molybdenum Mines Co., Omak, Wash., operating in Moses Mountain mining district, about 25 miles from Omak, is considering new reduction mill at properties. Cost over $250,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for four distant reading hydrostatic tank gages (Schedule 9255) for Mare Island Navy Yard; one turret lathe (Schedule 9254), three radial drills (Schedule 9296), six sensitive drills, all motor driven (Schedule 9261), for Puget Sound Navy Yard; one crane hoist truck (Schedule 9302) for San Diego Navy Yard.

Vernon Brewing Co., Vernon, Cal., care of Daniel M. Hunsaker, Rowan Building, Los Angeles, representative, has taken out State charter to erect new brewing plant at Vernon. Plans nearing completion for initial units and bids will soon be asked. Cost about $175,000 with machinery. F. A. Linck, 917½ Dos Robles Place, Alhambra, Cal., is supervising engineer, in charge.

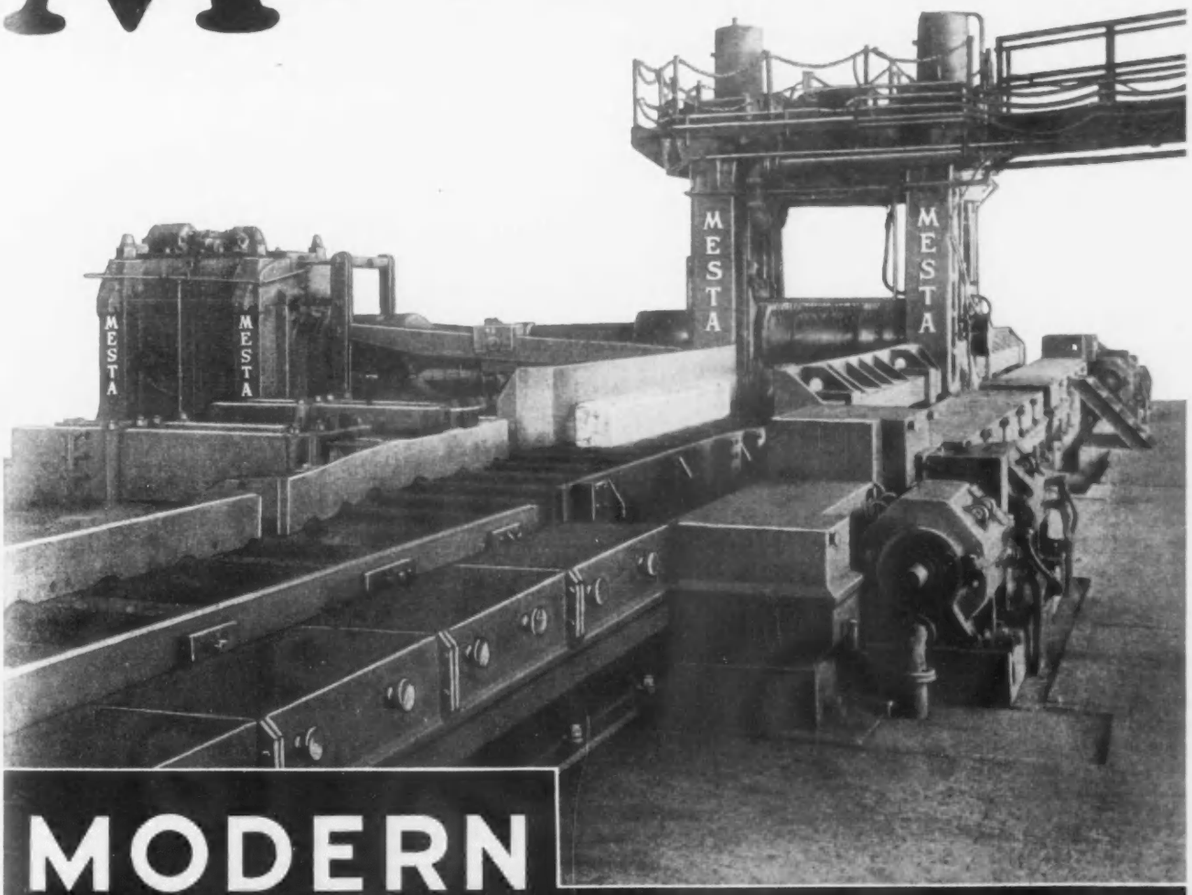
Babcock & Wilcox Co., 85 Liberty Street, New Work, contractor for steel pipe for penstock tunnels, for Hoover Dam, let general contract to Six Companies, Inc., San Francisco, for one-story steel pipe and assembly plant, 85 x 670 ft., at Bechtel, Nev., for project noted. Cost over $150,000 with equipment.

FOREIGN

Mitsubishi Soji Kaisha, Tokyo, Japan, will soon have plans drawn for new nitrogen-fixation plant for production of synthetic ammonia, at Nagoya, Japan. Plant will operate under process patents of International Electrolytic Plant Co., Ltd., Chester, England, for which rights are said to have been secured. It will include power plant, machine shop and other mechanical departments. Cost about $3,000,000 with machinery.

Soviet Russian Government, Moscow, is planning expansion and modernization program at steel works at Krasny Putilov, Leningrad. Cost over $1,500,000 with equipment. Amtorg Trading Corpn., 261 Fifth Avenue, is official buying agency.

Mesta



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How Bethlehem Steel Has Effected Employment Stabilization

(Continued from page 955)

the situation for our employees, but as the production rate dropped lower and lower we found that there was not enough work available to provide employment for all. Accordingly, late in the spring of 1932 we found it necessary to make adjustments and to undertake suspensions which we had hoped to avoid. It is our experience that it is impossible to maintain a complete normal force even on part-time after production levels drop below 30 per cent. Our present force is approximately two-thirds of the total formerly required during peak operations. Much of the curtailment came about in the natural course of labor turnover and the cessation of hiring any new men. In addition there was the weeding out of the less effective personnel acquired at the height of prosperity and who would not have been continued even in normal times. Though our operations dropped nearly 90 per cent, the actual dismissal of persons whom we would have retained had business permitted amounted to not more than 15 per cent of our total force.

Credits for Fuel and Other Supplies

The policy of shared work loses its value unless at least a subsistence can be provided. Charges against the pay envelope which are negligible in normal times serve to defeat the purpose of the plan. In normal times there will be deductions for the relief fund, for fuel purchases, for safety shoes, rent and other supplies which the men desire. These deductions are voluntary. Nevertheless, in this crisis, the extension of credits has been necessary, wherever the pay envelope drops to a certain minimum.

Fuel is one of the biggest items of credit. Our employees can at all times purchase coke from the company at low prices, and normally this is charged against their pay. In the past year, however, about a third of the coke has been bought on indefinite credit. I think it a significant tribute to the thrift and good faith of our employees that 90 per cent of the coke purchases on credit has been paid for within a few weeks to a few months after purchase.

Made Work a Stop-Gap

During part of the depression we were able to alleviate the more needy cases among our employees by the introduction of an emergency program. Repair jobs, tearing down of obsolete buildings, painting and certain construction projects were authorized to give extra employment, in addition to the regular part-time work, to those men who had particularly heavy family responsibilities. Because this was work that would not have been done at the time, were it not for the purpose of affording relief, the work was separated from regular production work and paid for at special wage rates, averaging about 30 per cent below regular wage rates. In this way some men who were faced with the necessity of applying for charitable aid in addition to their earnings were able to augment their income to care for their situations, and the company at the same time received some return. We were able to provide employment of this type to 10,503 men for about six months, but eventually the number of jobs that could be justifiably scheduled on this basis was exhausted and, furthermore, capital resources did not permit carrying the work on further.

Employee Gardens Extended

Fortunately the spring of the year coincided with the cessation of emergency employment within the plants, affording us the opportunity to turn our attention to what might be termed emergency employment outside the plant. Employee gardens played a large part in taking up the slack. Families were able to cultivate land, growing vegetables for the summer supply, with a surplus for sale or exchange or carrying into the winter. In previous years some of our plants had fostered employee gardens, and in our mining communities this has been a feature for a number of years.

For the first time this year, however, the Bethlehem Steel Corpn. encouraged the employee garden program as a company-wide project. Company land was plowed, harrowed and allotted to employees on application. Additional land was obtained from generous citizens where the need arose. More than 7500 families undertook gardens on company property, or under the company's supervision, during the past season. This represents but a part of the grand total, for most of our plants are in small cities, or in semi-rural communities, where the bulk of the employees have individual homes and land enough around their houses to permit home gardening. A recent estimate placed the market value of the yield from these gardens at a quarter of a million dollars.

Relief and Relief Agencies

Under any conditions, there are always a certain number of cases requiring direct financial relief. Very largely we have made it unnecessary for our regular employees to seek public aid.

First of all, the employees have their own relief plan, administered without cost by the corporation, supported by monthly payments of the employees. This seems to meet all normal cases of illness and other special crises in the life of the regularly employed worker. Relief fund payments under this plan totalled $1,079,000 in the past year.

In spite of all this, there are casual workers and virtually unemployable workers in every community who are an unavoidable social responsibility. We believe it important to keep constantly in touch with all the relief agencies. First of all, if any of the relief cases are our employees, we are able to exchange information and see how much relief is warranted. In many instances, the employee's affairs can be adjusted to take him off the public relief rolls.

Through assisting in the coordination of relief work, we have been able to make the relief dollar go further. In one community we were able to contribute a building, heated and lighted by the plant, in which all welfare agencies could be under one roof.

Dismissal Wages

Aside from the relief feature which deals with emergencies, with casuals and unemployables, we all have the problem of those workers who for one reason or another are not further needed in our employ. For these cases we have made considerable use of the dismissal wage.

Our philosophy with respect to the dismissal wage differs somewhat from the theory adopted by some companies. We make a distinction between it and unemployment insurance. We do not feel that every termination is entitled to a dismissal wage, and, if the terminated employee is considered as available for future reemployment, the dismissal wage is not effective. In other words, it applies only where the termination of the employee is considered final. The amount paid depends upon prior earnings and years of service. It affects those who are not old enough to be eligible for pensions. We adopted it primarily for salaried workers, though it has been applied also in particularly meritorious cases among wage earners.

Advancement of Pensions

Our view of the dismissal wage may be illustrated by a still further step. In certain cases we have put men nearing the pension age on the pension roll before they reached 65 years of age, normally required. In such instances the pension is smaller, being figured out on an actuarial basis to cover the added risk. In other words, if a man of 60 is terminated and he would be eligible for pension at 65, the following process is adopted; The interest on the cost of carrying his pension for the extra

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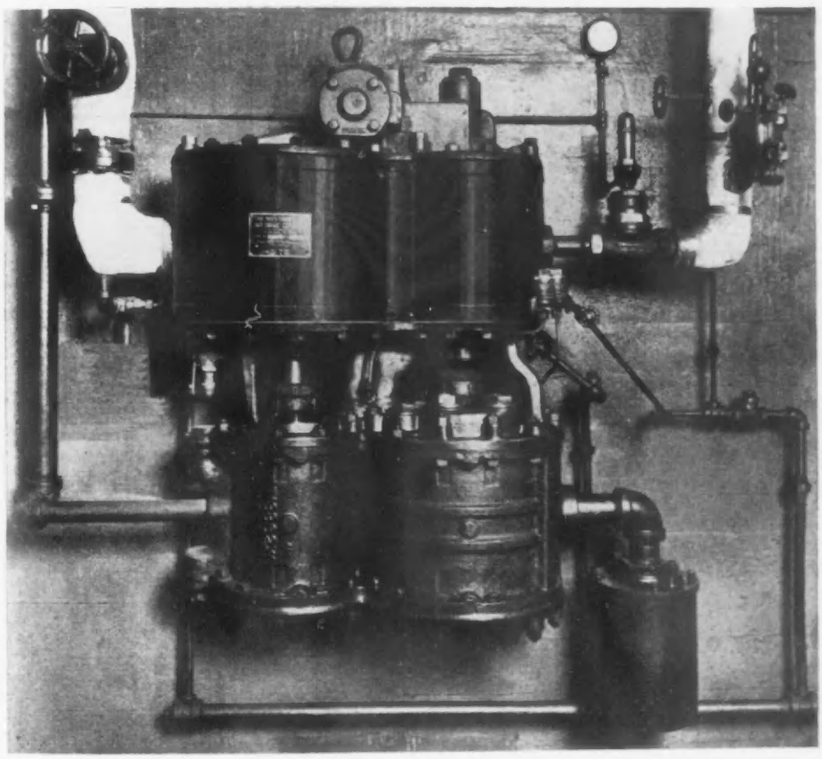
HIGH AIR CAPACITY—

LOW STEAM CONSUMPTION



The Westinghouse cross compound steam driven compressor is an efficient machine . . . It has a displacement of 150 cu. ft. per minute and will furnish sufficient air for a great variety of pneumatic requirements . . . Very little steam is used for a given amount of air compressed as both steam and air are compounded . . . In hundreds of industrial plants this compressor has won favor because of low first cost, economy of operation, reliability, and remarkable durability . . . The 10½" cross compound compressor, as illustrated, is for normal operation on 100 pounds steam pressure against 80 pounds air pressure . . . We also make a complete line of motor driven air compressors, ranging in sizes from 2½ to 300 cu. ft. displacement.

WESTINGHOUSE
TRACTION BRAKE CO.

Industrial Division Pittsburgh, Pa.

years is deducted. A deduction is also made for the added probability of death, for if we advance the pension from 65 to 60 years of age a certain number will be pensioned who otherwise would die between these ages. Accordingly, some financial set-up must be made to care for this. The cost of this added risk should properly be borne by those who enjoy the benefit of coming on the pension roll earlier than the regular pension plan allows for.

Self-Reliance Through Thrift

Looking to the future, I believe that we shall find that one of the greatest means of protection which the worker has is the cultivation of the habit of thrift. I believe that our company will take even more active steps than in the past in encouraging the habit of saving.

Our experience with our employee saving and stock ownership plan over a period of years has illustrated the self-reliance of our employees, who have steadily laid by sums for difficult times such as these. In fact, these savings accounts have gone far to tide the employees over in these difficult days of short-time employment.

Under our plan the shares of stock which could not be paid for were cancelled. The worker was returned his installments with 5 per cent interest, so that the system was definitely a savings program which could be called upon in time of need.

I believe that in the long run many advantages will come from the hard lessons which we have learned in this problem of employment stabilization. Our superintendents have accomplished production economies which they themselves would not have thought possible. They have been able to keep their costs within reasonable bounds, even while carrying on the difficulties of operations under the conditions of spread employment. The cut in wage rates, of course, was a factor in making this possible, and, in fact, in the lower levels of the depression a wage rate cut was inescapable if our corporations were to endure and the larger number of regular employees were to be kept on the payroll, even at part-time work.

This flexibility in operation, this retention of our organization without seriously imperiling the personnel, this economy in production methods, means that business is better fitted than ever before to do its job. Industrial improvements which economize in labor create more jobs in the long run. When industry is operated efficiently goods can be produced more economically, the investor gets more return on his money, there is more money available for new projects, there is a greater demand for products and new employment is thereby created.

Employment stabilization, the recognition of the importance of the security of the job, is one of the great contributions to industrial history which has come out of our experiences of the past three years.

Facts and Threats of Technocracy

(*Concluded from page 963*)

steam engine and machinery that as early as 1830, over 100 years ago, 40,000 people made as great a yardage of fabrics as could have been produced by the old and worthy and time-honored methods of 40,000,000 people. According to the logic of Technocracy (which none may dispute) this created an unemployment of 39,600,000 which was about 19,000,000 more than actually lived in England at the time. Think of it—not only a complete 100 per cent unemployment but 19,000,000 more out of work who had never been born. You cannot go behind statistics. The picture of unborn children being unemployed is too harrowing for further literary exploitation."

Now as to the impossibility of obtaining the data which Technology claims to have obtained in arriving at its conclusions.

I quote again from Prof. Walter Rautenstrauch.

"How much energy was expended annually in production every year between 1830 and 1930 and how many men were employed annually and for how many hours and how much was produced each year are the four basic facts the charts reveal for each of 3000 commodities."

You gentlemen here today know something about the methods of obtaining statistical data. I ask you with how much confidence would you approach the task of allocating man hours and energy to each of 3000 commodities for each year of the past hundred years?

Furthermore, do you even believe that you could name 3000 commodities classed as manufactures which exist today and which at the same time existed 100 years ago?

It is ridiculous to attempt man-hour comparisons with any expectation of even approximate accuracy for the reason that sufficiently accurate data, except for comparatively recent years, cannot be obtained. It would be necessary to have access to time sheets or payrolls, which are not obtainable. Average customary working hours for given periods are of little value, even in arriving at rough estimates, because of great variation from "standard" practice, discontinuity in individual employment, undertime and overtime conditions due to cyclical changes, etc.

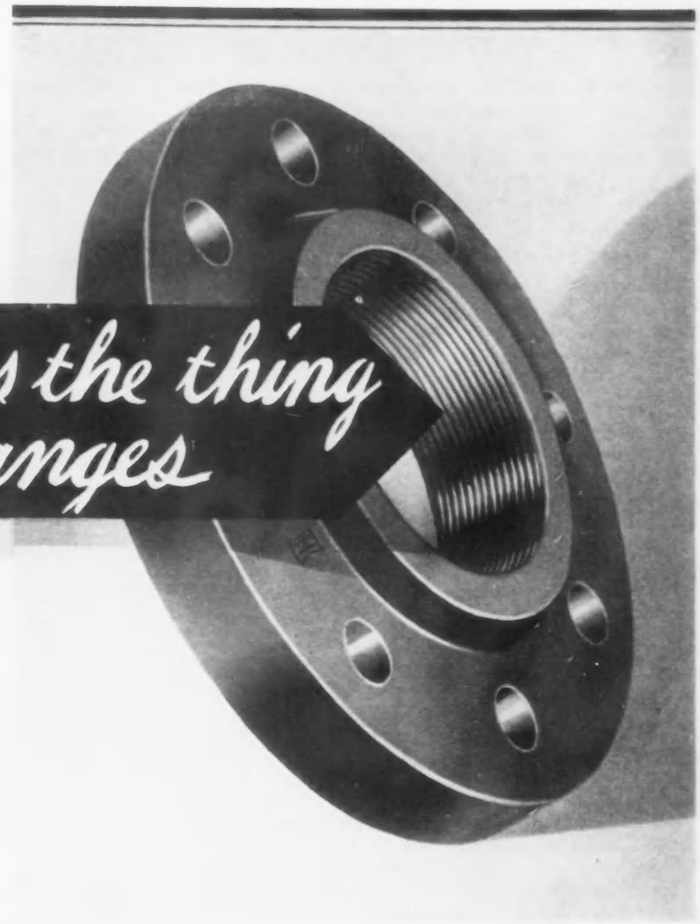
Now I come to the fourth indictment of Technocracy's claims, namely that it is possible to make a "thermo-dynamic interpretation of social phenomena" and through this to set a limit upon progress by power resource inventories, known or expectable.

That their premise may be clear to all of you, let me quote the following from Dr. Scott:

"Technocracy makes one basic postulate: that the phenomena involved in the functional operation of a social mechanism are material. It defines science as 'the methodology of the determination of the most probable.' Technocracy therefore assumes from its postulate that there already exist fundamental and arbitrary units which, in conjunction with derived units, can be extended to form a new and basic method for the quantitative analysis and determination of the most next probable state of any social mechanism. Technocracy further states that, as all organic and inorganic mechanisms involved in the operation of the social macrocosm are energy-consuming devices, therefore the basic metrical relationships are: the factor of energy conversion, or efficiency; and the rate of conversion of available energy of the mechanism as a functional whole is a given area per time unit. Technocracy accordingly establishes a new technique of social mensuration, that is to say, a process for determining the rates of growth of all energy-consuming devices within the limits of the next most probable energy state."

The weakness of Technocracy's assumption, it seems to me, is that it measures what can be done by what has been done. It deals with ergs, kilowatts, horsepower and calories, but takes no account of ideas which cannot be weighed, measured or even seen but which control all human progress. Who in the days of the treadmill could foresee the water wheel or wind mill? Who before the days of Watt could foresee steam put to work? Who, before Otto, could predict the gas engine? Who, today, can say how soon it will be or how long before we may uncover new and unthought of methods of securing enormously increased power resources? The sun still shines, we have the cosmic rays and the tremendous latent power of the atom, of which it is told us by scientists that the atomic energy contained in a glass of water would be sufficient to drive a battleship across the ocean. No man can say when or where the power of ideas will tap these or unthought of power sources which will make our present known power potentialities insignificant in comparison.

In its absorption with theory, Technology has obviously disregarded facts in connection with the case history of merchanization and employment. It has overlooked, entirely, the fact that society has continuously, since the application of machinery, applied the corrective of the shortened working period, to make up for increased productivity. The result of this has been a practically steady increase in the density of employment from 1849 to 1930.



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Harrisburg Flanges Are • Precision-Made • for Perfect Threading

There is one thing that makes flanges stand up where pressures are the greatest, vibration the worst, and where new assemblies are most frequently required—that one thing is accuracy of threading. Contrary to usual practice Harrisburg flanges are precision-made. Their threads are carefully machined to give fulness and uniformity—perfection in height, angle and gauging. Depend on them.

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HARRISBURG

Drop Forged FLANGES

Liquid Baths for Heat Treating

(Concluded from Page 959)

immersion in vigorously boiling 10 per cent aqueous sodium cyanide solution for ½ to 1 hr. will result in disintegration of the salts to a powder which can be removed by scratch-brushing or by light sand or shot blasting.

Operation of Salt Baths

HERE is the most important general rule of salt bath operation: Do not allow the bath to become contaminated with anything. This applies to salt baths in all temperature ranges.

Purity of Ingredients

When making salt mixtures, fairly pure salts should be used. "Chemically-pure" brands are not ordinarily required, but the best grades of commercial salts are none too good. Sulphates are particularly undesirable in all mixtures, and nitrates should not be present in medium or high-temperature baths. Either of these impurities will cause pitting of the work. To eliminate small amounts of these corrosive impurities from a bath, throw in 5 to 10 per cent of the weight of the bath of clean, dry cast iron chips, preferably while the bath is near the top limit of its temperature range, stir well, allow to settle and remove the sludge formed. If a rectifier is to be used, it will serve also to eliminate sulphates and nitrates.

More General Operating Rules

Heat salts slowly while solid; they are all poor conductors of heat, and the rate of heat absorption is therefore limited when there can be no circulation; an attempt to melt too quickly only results in overheating of the pot with consequent short life, and possible overheating of the salt adjacent to the pot.

When additions of salt or rectifier (except boric acid) are to be made, it is safest to place the required quantity on top of the solid salt before melting down; if this is not practicable, because of 24-hr. operation or high drag-out which necessitates more frequent additions, be sure the added salt is dry.

A salt of high-melting point causes greater overheating of the container during melting than does a lower-melting salt. A salt having low melting point is also desirable when large work is to be heated, as the immersion of a large mass of metal lowers the temperature of so much of the adjacent salt that a thick coating of solid salt will form on the work; this greatly retards the rate of heating, especially with a high-melting point bath which, of course, forms not only a thicker coating but one which is not quickly remelted.

If possible, large work should be preheated up to the melting point of the bath, then immersed with the bath just above its melting point, and the bath and metal slowly heated to the desired temperature.

Melting point of the bath is not usually important for small work, provided the melting point is at least 100 deg. F. (56 deg. C.) below the operating temperature; small pieces can be immersed, preferably after some preheating, with the bath at the operating temperature; if many pieces are to be heated at the same temperature, it is advisable to establish a semi-continuous procedure, immersing a small quantity immediately after removing an equal quantity. It is advisable to remove the thermocouples, at the end of a run, before the salt freezes (more about thermocouples later).

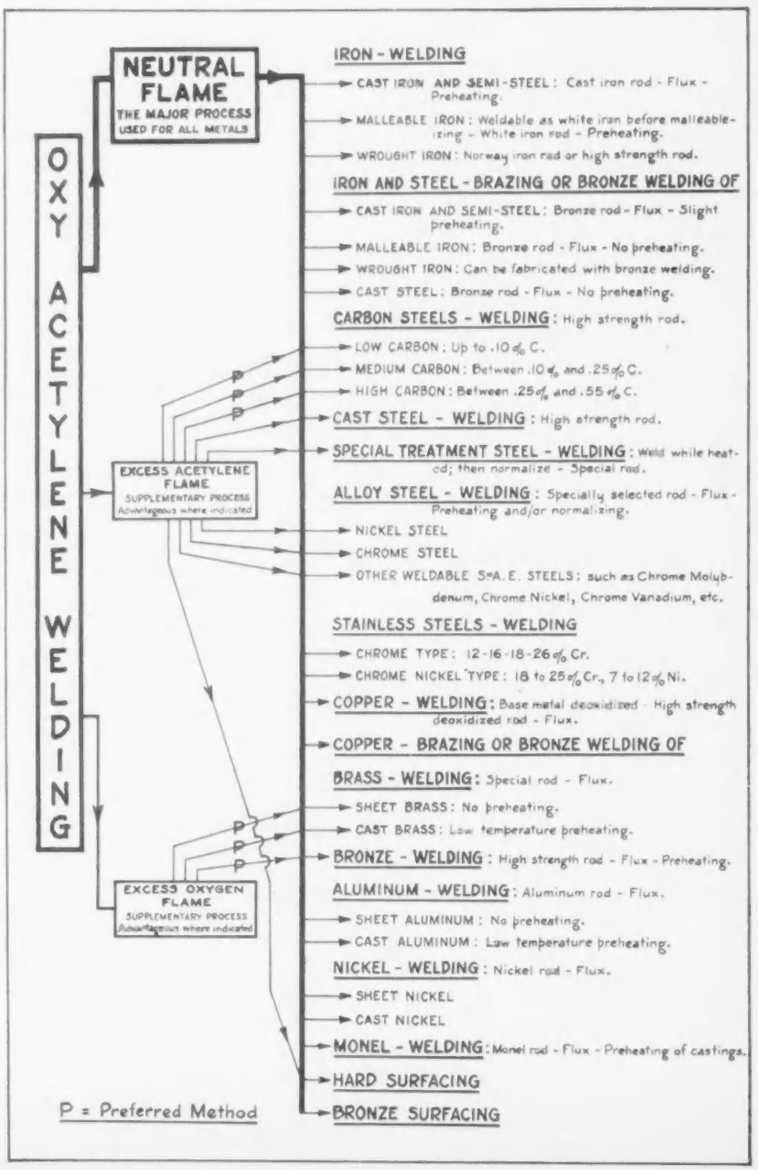
Salt baths weigh from 100 to 150 lb. per cu. ft., molten.

(To be concluded)

Chart of Oxy-Acetylene Welding Applications

THIS chart pictures in convenient form the range of work for which oxy-acetylene welding equipment may be used. It shows not only the metals that can be welded with the neutral flame, but also indicates where supplementary types of flame adjustment may be used to obtain greater economy or better quality. Filler metal to be used, whether or not flux is needed, and whether preheating is good practice or is not required, are included also.

Although cooperation with your source of gas supply or of maker of your equipment is still recommended in the solution of new welding problems, this chart permits a quick check as to whether specialty jobs can be handled at all by gas welding. It was prepared by the oxy-acetylene committee of the International Acetylene Association.


OXY ACETYLENE WELDING
NEUTRAL FLAME
THE MAJOR PROCESS USED FOR ALL METALS
EXCESS ACETYLENE FLAME
SUPPLEMENTARY PROCESS Advantageous where indicated
EXCESS OXYGEN FLAME
SUPPLEMENTARY PROCESS Advantageous where indicated
P
IRON - WELDING
CAST IRON AND SEMI-STEEL: Cast iron rod - Flux - Preheating.
MALLEABLE IRON: Weldable as white iron before malleableizing - White iron rod - Preheating.
WROUGHT IRON: Norway iron rod or high strength rod.
IRON AND STEEL - BRAZING OR BRONZE WELDING OF
CAST IRON AND SEMI-STEEL: Bronze rod - Flux - Slight preheating.
MALLEABLE IRON: Bronze rod - Flux - No preheating.
WROUGHT IRON: Can be fabricated with bronze welding.
CAST STEEL: Bronze rod - Flux - No preheating.
CARBON STEELS - WELDING: High strength rod.
LOW CARBON: Up to .10% C.
MEDIUM CARBON: Between .10% and .25% C.
HIGH CARBON: Between .25% and .55% C.
CAST STEEL - WELDING: High strength rod.
SPECIAL TREATMENT STEEL - WELDING: Weld while heated; then normalize - Special rod.
ALLOY STEEL - WELDING: Specially selected rod - Flux - Preheating and/or normalizing.
NICKEL STEEL
CHROME STEEL
OTHER WELDABLE S.A.E. STEELS: such as Chrome Molybdenum, Chrome Nickel, Chrome Vanadium, etc.
STAINLESS STEELS - WELDING
CHROME TYPE: 12-16-18-26% Cr.
CHROME NICKEL TYPE: 18 to 25% Cr., 7 to 12% Ni.
COPPER - WELDING: Base metal deoxidized - High strength deoxidized rod - Flux.
COPPER - BRAZING OR BRONZE WELDING OF
BRASS - WELDING: Special rod - Flux.
SHEET BRASS: No preheating.
CAST BRASS: Low temperature preheating.
BRONZE - WELDING: High strength rod - Flux - Preheating.
ALUMINUM - WELDING: Aluminum rod - Flux.
SHEET ALUMINUM: No preheating.
CAST ALUMINUM: Low temperature preheating.
NICKEL - WELDING: Nickel rod - Flux.
SHEET NICKEL
CAST NICKEL
MONEL - WELDING: Monel rod - Flux - Preheating of castings.
HARD SURFACING
BRONZE SURFACING
P = Preferred Method